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Iowa Water Quality Management Plan Iowa-Cedar River Basin

Iowa Dept of Environmental Quality, Des Moines

Jul 76

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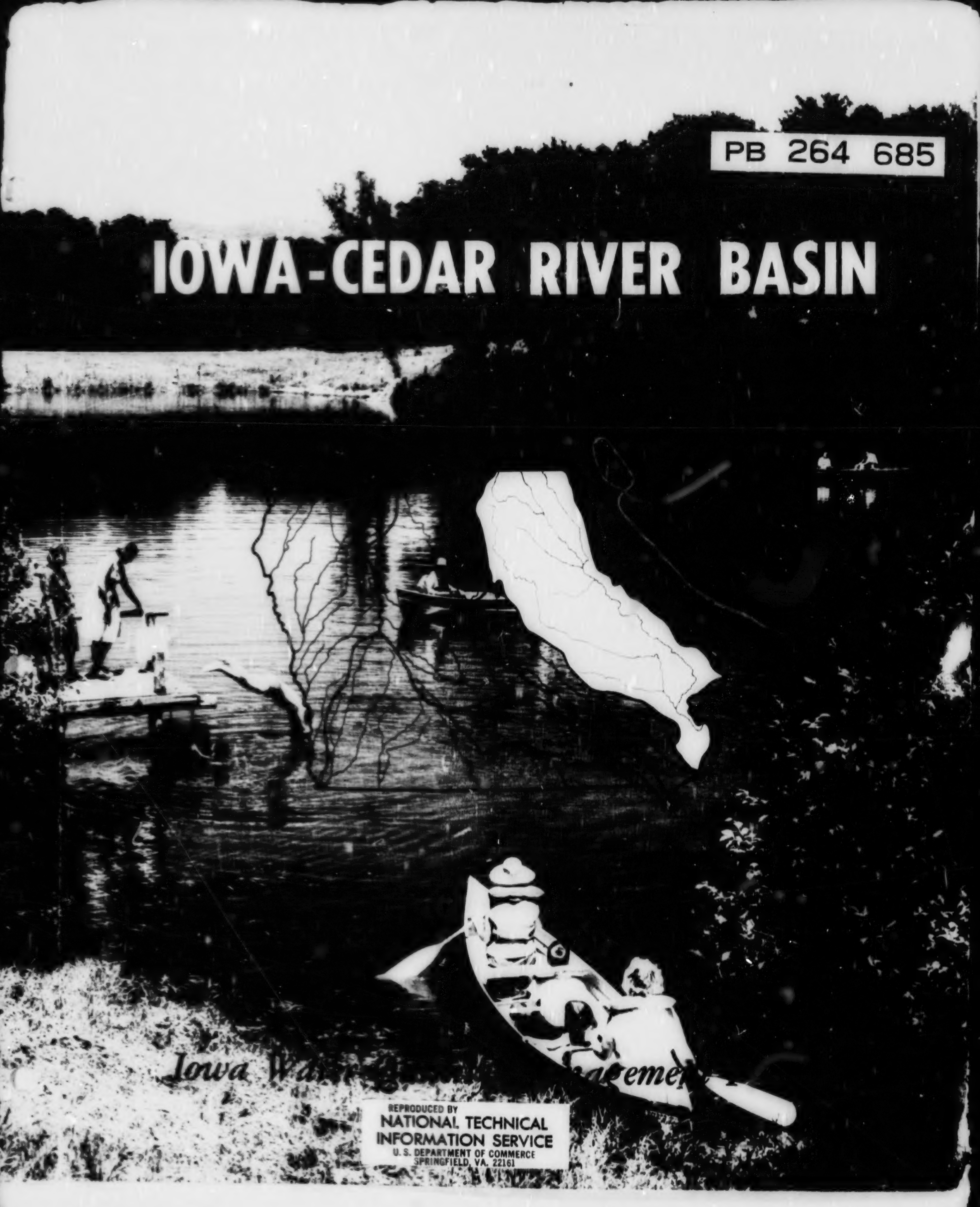
IOWA-CEDAR RIVER BASIN



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TECHNICAL REPORT DATA

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1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Water Quality Management Plan, Iowa-Cedar River Basin		5. REPORT DATE
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Water Quality Management Division Iowa Department of Environmental Quality P.O. Box 3326 Des Moines, IA 50316		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Same as above		13. TYPE OF REPORT AND PERIOD COVERED
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This basin plan is for one of six major river basins partially located in Iowa. These plans fulfill Phase I requirements of Section 303(e) of Public Law 92-500, the Federal Water Pollution Control Act Amendments of 1972. It includes a determination of existing water quality, applicable water quality standards, and significant point and nonpoint sources of pollution within the basin. Point source pollution abatement is the main emphasis of the plan. The plan contains effluent limits for point source wastewater discharges, compliance schedules to meet these limits, a priority ranking of municipal discharges for use in determining the distribution of Federal and State grant funds used in the construction and/or upgrading of municipal wastewater treatment plants, and a table of municipal and industrial wastewater treatment needs.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Basin Plans, Iowa, Iowa-Cedar River Basin, Water Quality		

18. DISTRIBUTION STATEMENT Unlimited Distribution Sponsored by EPA	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES 402
	20. SECURITY CLASS *(This page)*	22. PRICE PC-A18/MF-A01

EPA Form 2220-1 (9-73)

WATER QUALITY MANAGEMENT PLAN

IOWA-CEDAR RIVER BASIN

July, 1976

The Iowa Water Quality Commission approval of these plans is limited to the criteria and strategies described in the plans. Specific effluent limits, compliance schedules and discharger rankings must be considered tentative. New information, growth patterns, industrial development, grant funds and numerous other factors will require that the operation permits issued to each discharger reflect the most current information available and therefore they may vary from the values and the dates contained in the plans.

PLANNING AND ANALYSIS SECTION
WATER QUALITY MANAGEMENT DIVISION
IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY

ACKNOWLEDGMENT

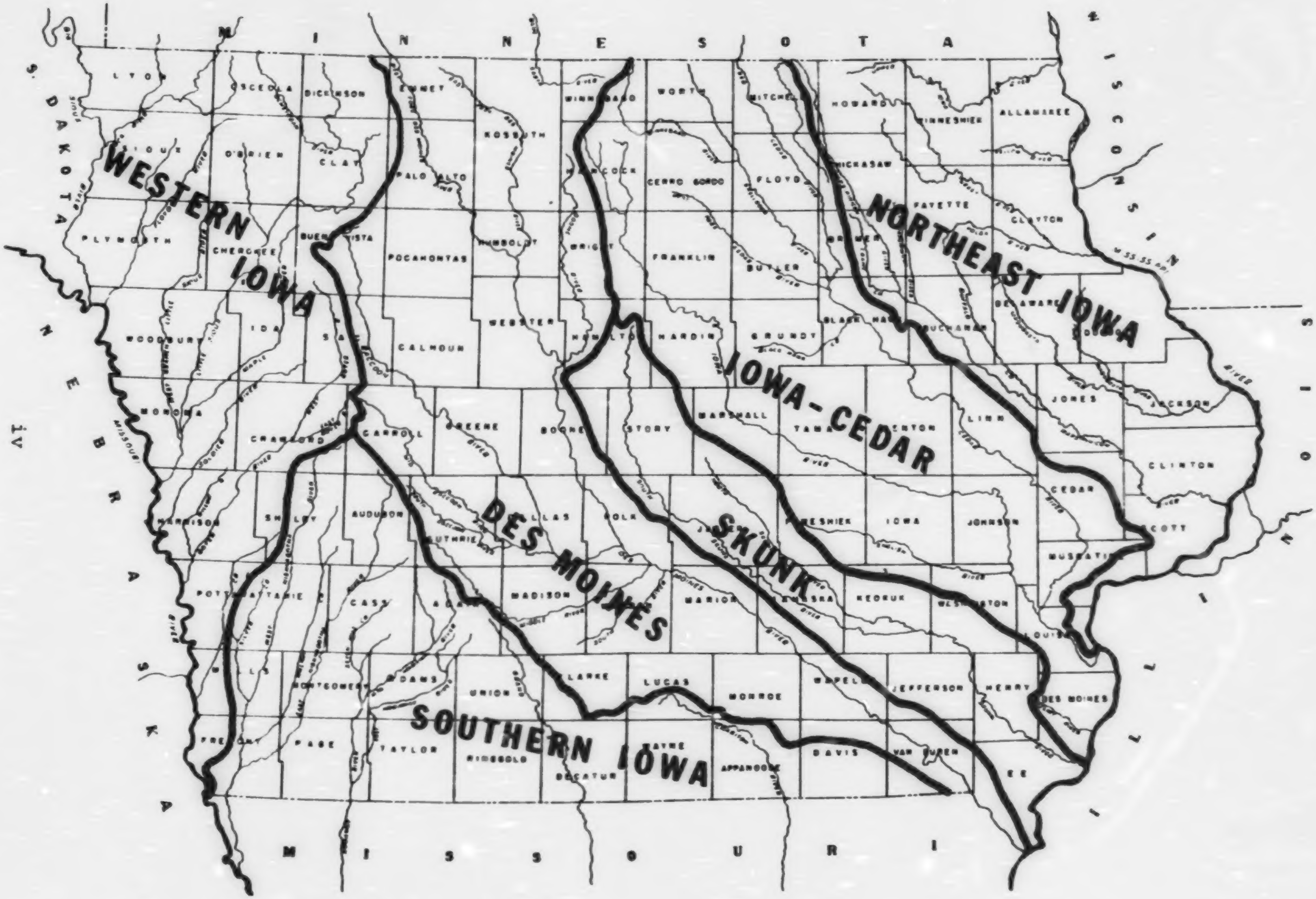
Water Quality Management Plans for the State of Iowa were prepared by the Department of Environmental Quality, Water Quality Management Division, Planning and Analysis Section. We gratefully acknowledge the assistance of the many State and Federal agencies and individuals that have provided data, reviewed drafts, and helped in other ways during the formulation and preparation of this plan. We also acknowledge the work of Howard R. Green Company in the compilation of this plan, and of Stanley Consultants, Inc. in the development of a portion of the preliminary waste load allocations, both under contract to the Department of Environmental Quality.

FOREWORD

Under section 455B.31, Code of Iowa, 1973, the Iowa Department of Environmental Quality (DEQ) is charged with the responsibility of protecting and maintaining surface and ground water quality throughout the State. To assist the Department in this task, this basin plan has been prepared to coordinate and direct the State's water quality management decisions on a river basin scale.

The national goal, established in the Federal Water Pollution Control Act Amendments of 1972, (the Act), provides for water quality suitable for the protection and propagation of fish and wildlife, as well as for recreational activities in all surface waters by July 1, 1983. The Amendments define basin planning (Section 303(e)) as a key element for the determination and implementation of the necessary requirements to achieve national water quality goals.

Six major river basins, as defined by the Department of Environmental Quality, are partially located in the State of Iowa. Basin boundary lines are drawn to separate hydrological drainage areas (Figure 1). Any minor deviation from this is done only to be consistent with the boundaries of the six Iowa Conservancy Districts, as established by Chapter 467D.3 of the Code of Iowa. This provides the most compatible use of data among different State agencies.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NEBRASKA
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WESTERN IOWA
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DES MOINES
SOUTHERN IOWA
LYON
OSCEOLA
DICKINSON
EMMET
WINNEBAGO
WORTH
MITCHELL
HOWARD
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ALLAMAKEE
SIOUX
O'BRIEN
CLAY
PALO ALTO
KOSSUTH
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
FAYETTE
CLAYTON
PLYMOUTH
CHEROKEE
BUENA VISTA
POCAHONTAS
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JEFFERSON
HENRY
DES MOINES
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE
MISSISSIPPI RIVER
MISSOURI RIVER
SIOUX RIVER

FIGURE 1

IOWA RIVER BASINS

This basin plan is one of a series for the six major river basins in Iowa. These plans are supplemented by the Supporting Document for Iowa Water Quality Management Plans which contains general information of a supporting or background nature applicable to all six basins. The planning documents will be prepared by the Water Quality Management Division of DEQ. The planning information contained herein is part of a continuing planning process. Changes will occur since this plan describes a dynamic process. Basin plans will be reviewed at least every five years with interim revisions as significant changes occur.

This plan includes a determination of existing water quality, applicable standards, and significant point and nonpoint sources of pollution in the Iowa-Cedar River Basin. The plan then identifies and sets forth measures to correct the basin's water quality problems. Authority for this basin plan is derived from Section 455B.32, of the Code of Iowa.

This basin plan is specifically directed towards satisfying requirements of section 303(e) of the Federal Water Pollution Control Act, as amended; Public Law 92-500, 86 Statute 816 (1972); (33 United States Congress 1251 *et sequens*). The plan will serve local and regional governments as well as State and Federal agencies.

SCOPE

This basin plan addresses the Iowa-Cedar River Basin from the Minnesota-Iowa State line southeast to the confluence of the Iowa River with the Mississippi River. Because it is a part of the same conservancy district, the Flint Creek Basin is also defined to be in the Iowa-Cedar River Basin (Figure 2).

The scope of this plan entails the study of the following items: (1) Water Quality Management Programs, (2) Existing Development Patterns and Basin Characteristics, (3) Existing Water Quality, (4) Inventories of all Point Sources of Wastewater Discharge, (5) Assessment of Nonpoint Pollution Sources, (6) Stream Segment Analyses and Waste Load Allocations, and (7) Assessment of Needs and Compliance Schedules. The detail of study of this document is as follows:

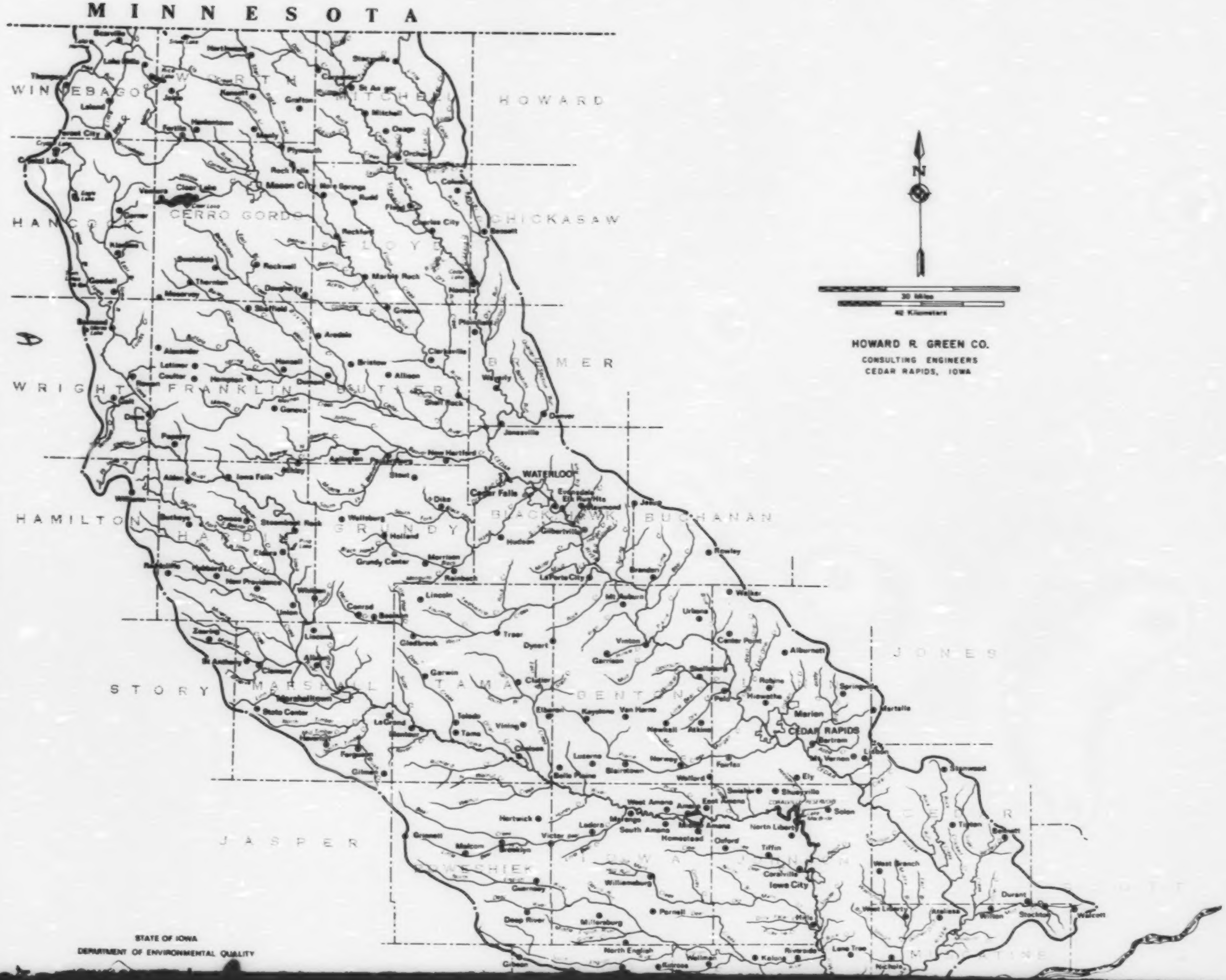
Chapter

I. Iowa's Water Quality Management Program

A synopsis of the basin planning process is presented along with a brief description of the DEQ's water quality management program and strategy.

II. Existing Development Patterns

Information concerning population, land use economics and recreational activities within the basin is presented.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BUCHANAN
STORY
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BENTON
LINN
JONES
JASPER
POWESHIEK
IOWA
JOHNSON
CEDAR
SCOTT
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Charles City
Waverly
Waterloo
Cedar Falls
Marshalltown
Vinton
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CEDAR RAPIDS
Iowa City
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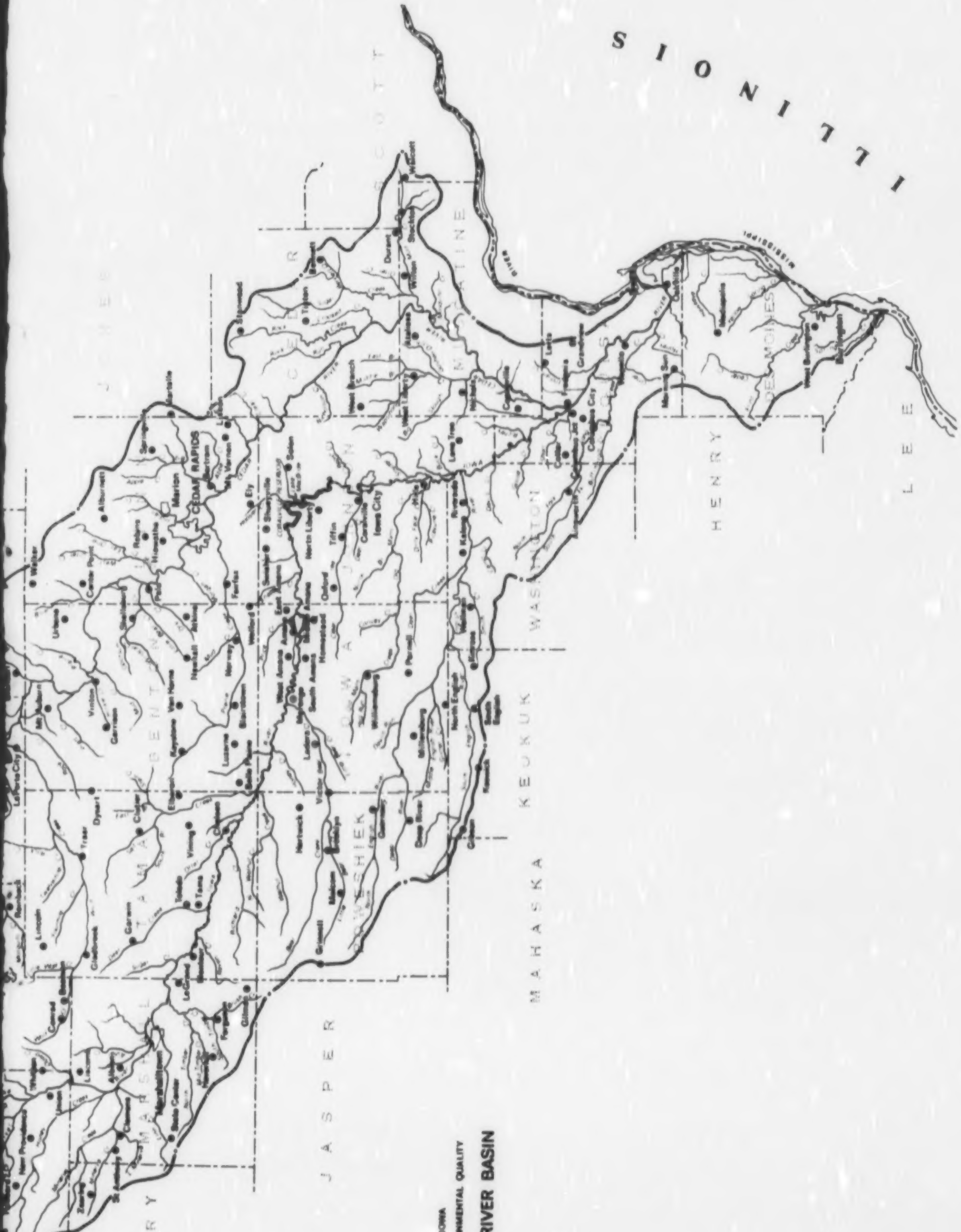
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Marshalltown
STORY
JASPER
POWESHIEK
IOWA
JOHNSON
Iowa City
KEOKUK
MAHASKA
WASHINGTON
LOUISA
HENRY
DES MOINES
LEE

STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN

B

FIGURE 2

III. Basin Characteristics

The physical characteristics of the basin, including topography, climatology, physiography, geology, hydrogeology, hydrology, and ground water quality are discussed.

IV. Water Quality

Iowa Water Quality Standards and Stream Classifications are delineated. Available water quality data have been accumulated and evaluated to present the best possible picture of the recent history of basin water quality. Existing water quality is described and then compared with the Iowa Water Quality Standards.

V. Point Source Discharge Inventory

Available records have been reviewed to determine the location and characteristics of point source wastewater discharges. This information is tabulated and summarized.

VI. Waste Load Allocations and Rankings

The results of the waste load allocation analyses for the basin are listed. Waste load reductions for each point source waste dischargers are given. Segments are classified and ranked. Dischargers are ranked.

VII. Nonpoint Pollution Sources

The problems of nonpoint pollution sources are addressed. Combined sewer overflows, urban runoffs, and rural sources of pollution from animal feeding operations and general agricultural activities are characterized. Based upon information extrapolated from other areas, the potential pollution from typical sources is identified.

VIII. Needs and Compliance Schedules

An evaluation of the needs for improved wastewater treatment in the basin is presented. A summary of the estimated costs associated with these needs is also given.

IX. Conclusions and Recommendations

Conclusions drawn from the plan are presented along with several recommendations that would aid in attaining the goal of improved water quality.

X. Review and Revision

The procedures for review and revision of this plan are briefly described.

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CHAPTER I

IOWA'S WATER QUALITY MANAGEMENT PROGRAM

The main objective of water quality management is protection and enhancement of water resources to insure acceptable conditions for designated uses. The establishment of a realistic management program requires a comparison of existing water quality with the desired water quality.

The Iowa Water Quality Standards, as adopted by the Iowa Water Quality Commission, establish a baseline for desired water quality and stream uses. The National Water Quality Criteria, as proposed by the U. S. Environmental Protection Agency (EPA), provide an additional measure of desirable water quality.

WATER QUALITY STANDARDS

Iowa's Water Quality Standards and accompanying use classifications were established by the Water Quality Commission. They were adopted by the State on February 12, 1974 and approved by the U. S. Environmental Protection Agency on March 26, 1974. When a water quality standard is violated the water, according to law, is polluted and its quality must be improved.

Water Use Classifications

The Department of Environmental Quality has responsibility for establishment of water use classifications for the surface waters of the State. Assistance in this task has been provided by the State Conservation Commission which has the major responsibility for fish and wildlife protection. Accordingly, the DEQ has defined four surface water-use classifications and has placed all surface waters of the State into one or more of these classifications. These classifications are:

Class A - Primary Contact Recreation; Class B - Wildlife, Secondary Contact Recreation and Aquatic Life (with subclasses for cold and warm waters); Class C - Potable Water Supply; and a General Water Quality Criteria. All surface waters are designated under the General Water Quality Critera. In addition, many streams are also designated for one or more of the Class A, Class B, or Class C uses. Each of the use classifications imply specific water quality standards.

Surface Water Quality Standards

Iowa Water Quality Standards define the constituent levels which may be present in the surface waters of the State. Specific concentrations of various constituents which should not be violated are assigned to each water use, in order to protect the water for that particular use.

The water quality standards shall be met at all times when the flow of the receiving stream equals or exceeds the seven day, 1-in-10 year low flow (7Q10). Exceptions may be made for intermittent or extremely low flow streams. When intermittent streams are classified for aquatic life protection, the Water Quality Commission may waive the (7Q10) low flow requirement and establish a minimum flow in lieu thereof. Such a waiver shall be granted by the Commission only when it has been determined that the aquatic resources of the receiving waters are of little significance at flows less than the establised minimum.

The specific criteria which apply to A, B, C, or General classifications are detailed in Chapter II of the Supporting Document For Iowa Water Quality Management Plans (1).

Revision of Water Quality Standards

The Act requires that the State shall from time to time, but at least once every three years, hold public hearings to review water quality standards and, if appropriate, modify and adopt new standards.

Some of the most likely changes in the Standards will be revisions of the use classifications. Since the National water quality goal is swimmable-fishable waters by 1983, most anticipated changes will be to upgrade existing Class B waters to include the current Class A usage. There will also be cases of upgrading waters, to which only general criteria apply, Classes A and B. Other revisions that may take place are changes in the criteria of the current Water Quality Standards. Any revisions in the Standards will be subject to public hearings and approval by the EPA before they may become law.

IMPLEMENTATION STRATEGY

If a management plan is to be effective, it must include a strategy for implementation of its proposals. This section gives a brief description of the DEQ's strategy for the implementation of its basin plans.

Strategy Summary

In most cases, water quality violations are the result of man's activities. Typical sources of pollution can include municipal discharges, industrial discharges, and runoff or nonpoint discharges associated with agricultural practices. The solution to water pollution is to identify the contributing sources and either eliminate or control them to the extent necessary to assure that water quality standards will not be violated.

Waste load allocation studies are performed to estimate the quantities of pollutants which may be discharged to receiving waters without exceeding the limits allowed by the water quality standards. Through the use of the waste load allocations, effluent limitations are established for municipal and industrial wastewater point source discharges. Only point sources of pollution are addressed in the waste load allocations in the initial version of the basin plans. This is because point sources of pollution are easier to identify and control. Nonpoint sources of pollution will receive further considerations in subsequent revisions to the plans. Regardless of what the waste load allocation study indicates, to be allowable, the Federal Water Pollution Control Act Amendments of 1972 (the Act), Public Law 92-500, requires publicly owned treatment plants to provide as a minimum, "secondary treatment," and industrial plants to provide, as a minimum, "best practicable control technology currently available" (B. P. T.) by July 1, 1977. The actual effluent limitations required under these degrees of treatment are described in Chapter VI.

The principal mechanism for attaining and maintaining compliance with the water quality standards is through the issuance of operation permits to all point sources of wastewater discharge. The permits contain either minimum allowable effluent limitations or limitations more stringent as necessary to assure compliance with water quality standards. Where existing sources are not in compliance with the effluent limitations, the operation permit will include an implementation schedule to assure compliance within a reasonable time period.

An additional step in the implementation of remedial measures to abate water pollution exists in the case of municipal wastewater treatment plants. Public Law 92-500, the Act, has established a program for assisting publicly owned waste treatment works with funding for improvements necessary to meet the goals of the Act. The DEQ, as the state water pollution control agency, has responsibility for administering the program. The final step, then, in the DEQ's strategy for implementation of the plan is to allocate the federal funds available for improvement of Iowa municipal treatment facilities.

Monitoring and Surveillance

Stream Sampling Station Network - The present Iowa stream sampling station network is a series of sampling points distributed throughout the State. These are permanent stations, sampled at the same location and on a quarterly frequency. The samples are normally analyzed for the same parameters every quarter. The objective of the sampling network is to give a general indication of water quality. The network is effective for measuring trends of either improvement or degradation of water quality. Although only minimal assistance is obtained in the area of enforcement, the network provides some background da for planning and assessing the effectiveness of the program.

The present network consists of thirty-six (36) stations across Iowa, each sampled quarterly. Eight of these stations are in the Iowa-Cedar River Basin. Stations on the Iowa are located at Marshalltown, Iowa City and Wapello. Stations on the Cedar are at Charles City, Cedar Falls, and Palo. The remaining two stations are at Northwood on the Shell Rock River and at Mason City on the Winnebago River. All stations are sampled by the State Hygienic Laboratory of the University of Iowa, under contract to the DEQ. The State Hygienic Laboratory also does the analyses.

In order to be more effective as a trend indicator, the monitoring network should be expanded. To be most effective, stations should be located below major point source discharges, and at points on the stream of distinct change in characteristic. These locations would be at points of confluence of major tributaries, above and below impoundments, and at points of change of water quality standards designation.

Intensive Stream Water Quality Surveys - The limiting factor in the effectiveness of the stream sampling network is its inability to detect cause and effect relationships. The DEQ's water quality monitoring program therefore includes a complementary program of intensive stream water quality surveys. The intensive surveys are in-depth studies of water quality in a specific area or segment of a stream, over a finite time period. The purpose of the survey is to provide a detailed determination of the biological, physical, and chemical qualities of the stream water. Information obtained is used to determine the effects of a specific point source or combination of point sources upon the receiving stream. The surveys provide documentation for enforcement actions and determine the effectiveness of any corrective measures initiated. Such surveys are also used for evaluating priorities, verifying waste load allocations, and as aids for planning.

The bulk of the intensive surveys program is conducted by the State Hygienic Laboratory. The lab usually performs both sampling and sample analyses. Intensive surveys are also conducted by the DEQ office to obtain answers to specific questions. For example, limited surveys are occasionally conducted by the DEQ Regional staff in connection with point source discharge compliance inspections.

All survey data storage and analysis are performed using computer data processing. The stream water quality data is also stored in the U. S. Environmental Protection Agency computer storage system, STORET. The STORET system includes a variety of report and analysis formats for evaluating and using the data.

Point Source Discharge Self-Monitoring - The principal tool for the management of point source discharge monitoring and enforcement of effluent limitations is the State Operation Permit Program, in coordination with the National Pollutant Discharge Elimination System (NPDES Discharge Permit Program). The permits not only set discharge effluent limitations and prescribe compliance schedules for bringing about corrections, but also specify a program for effluent monitoring and recording by the permit holder.

Dischargers are currently required to report to the DEQ each month. Report contents are specified and are tailored to the size and complexity of the plant and to the effluent limitations specified in the permit. Plant flows are required to be recorded as well as certain laboratory test results.

The self-monitoring reports are used as a screening mechanism to point out operation problems and existing or impending effluent limit violations. The reports are used as a guide to direct the DEQ resources to the needs for more detailed monitoring and possible enforcement action.

More importantly, however, the reports serve as an aid to the operator in evaluating his own operation. The requirements in effect mandate the availability of operational data which the operator can then use to improve his operation.

Another self-monitoring program is the State initiated Effluent Quality Analysis Program (EQAP). This is a program where the State Hygienic Laboratory mails specially prepared sample bottles to each discharger. The plant operator collects a sample at times and locations recommended by the DEQ, and mails the sample back to the State Hygienic Laboratory for analysis. Samples are analyzed monthly for Biochemical Oxygen Demand (BOD) and, in some cases, ammonia. Other water quality parameters compatible with acid fixing can also be analyzed from the EQAP sample. Occasionally, heavy metal or phosphorus analyses are performed at the request of the DEQ.

Plant Inspection - The DEQ also conducts on-site plant inspections. The purpose of the inspection is to provide an in-depth analysis of the operation, maintenance, and effectiveness of the treatment plant. The inspections provide verification of self-monitoring reports and determination of whether the plant is in compliance with permit stipulations.

Influent and effluent samples are collected and analyzed when possible, but in many cases visual observations of the effluent by the inspector can satisfactorily make the determination. The inspection also includes an evaluation of the effects of the effluent on the receiving stream, occasionally by sampling, but more often by visual observation.

The advantage of the on-site inspection over the other monitoring programs is the opportunity to make cause and effect evaluations. The inspector can observe the raw waste load and the operation and maintenance factors which determine the efficiency and effectiveness of the treatment process.

The value of the inspections is twofold; first, they provide a valuable tool for evaluating permit compliance and documenting the need for enforcement actions, and secondly, and equally important, they provide a vehicle for assistance to the operator. The inspectors can provide counsel and advice to the local officials on meeting permit requirements as well as operation and maintenance methods to improve plant operation and efficiency.

Plant inspections are normally made by the DEQ regional staff. The regional staff make the inspections when minimal or no sampling is needed in conjunction with the inspection. Central office staff make inspections when intensive composite sampling is required. The number of inspections conducted each year is limited by the availability of fiscal and personnel resources. Approximately three to four hundred municipal and industrial inspections are made each year, along with a similar number of quick stop visits. All municipal and major industrial plants should be inspected each year. The number of inspections will be increased as staff is added to the Regional offices.

Waste Load Allocations

Waste load allocations have been made for point sources of wastewater discharge in order to maintain water quality standards. The scope of the allocations was limited to evaluation of effluent limitations necessary to meet the dissolved oxygen (DO) and ammonia-nitrogen (NH_3-N) standards, at the 7-day, 1-in-10 year low stream flow.

The DO and NH_3-N parameters were selected for evaluation because they are generally the most critical criteria of the water quality standards. Data from five years of municipal treatment plant effluent sampling are available on these parameters and are readily adaptable to data processing. Other criteria within the water quality standards can normally be met with secondary treatment.

It is recognized that other parameters could be considered in the waste load allocation analyses. An analysis of historical water quality data shows that other water quality criteria have been violated and that critical conditions may also exist for some parameters during high stream flow periods. Some other parameters of particular concern include heavy metals, toxic elements, fecal coliform and thermal discharges. Where standards violations are apparent for parameters other than DO and NH_3-N they are studied on an individual basis and effluent limits incorporated into the operation permits. A more detailed waste load allocation analysis, however, will have to be left until subsequent revisions of this plan when additional data and information become available.

To predict the variation in DO and ammonia concentrations in the streams, a computer-based mathematical model was used. Input data for the model was developed from existing information and cursory field investigations of the streams. When necessary, conservative assumptions have been made that tend to assure a high degree of protection for water quality without necessitating unrealistically stringent effluent limitations. Future stream surveillance should help to verify particular constants and assumptions used, and improve the validity of the model. Based upon existing data prediction of the impact of different wastewater loads upon the DO and ammonia concentrations may be performed.

A detailed discussion of the mathematical model, methodology, and assumptions used in the waste load allocation analysis is included in Chapter IV of the supporting document (1). The final allocations for the Iowa-Cedar River Basin are contained in Chapter VIII of this report.

Permit System

The major mechanism by which the water quality management plan will be implemented is the wastewater construction and operation permit program conducted by the DEQ, under authority of Chapter 19, of the rules of the Department (1973 IDR). Any person intending to construct, modify or extend any wastewater disposal system in the State of Iowa must first obtain a construction permit from the Executive Director of the DEQ. An operation permit is also required prior to the operation of any disposal system, or the discharge of sewage, industrial waste, or other wastes from any discharge source. Chapter 455B of the Code also has provisions included for correcting violations of any permit, rule, standard, or order issued under Part I of Division III of the Chapter.

NPDES - The Federal Water Pollution Control Act Amendments of 1972 (the Act) established a National Pollutant Discharge Elimination System (NPDES) permit program. Any person presently discharging wastewater to public waters is required to obtain an NPDES permit. Any person proposing a disposal system which will result in a wastewater discharge is required to apply for an NPDES permit at least 180 days before such discharge is to commence.

The Act also established a procedure whereby the EPA can delegate permit authority to those States that desire to administer the NPDES program. The State must demonstrate ability to conduct the program and must have adequate legal authority to enforce the permits. The DEQ is currently preparing a delegation request to EPA for issuance of NPDES permits in Iowa.

Operation Permits - An operation permit is a legally enforceable document which specifies the type of wastewater which may be discharged, as well as the allowable quantities, concentrations, and rates of discharge. As a minimum, the effluent limitations are equivalent to secondary treatment for municipalities or BPT for industries, but, more stringent limits may be required as needed to meet water quality standards.

The permits also contain self-monitoring and reporting provisions that require dischargers to monitor their effluents and report the results to the DEQ. The DEQ data processing system stores and reports the water quality and compliance schedule data in formats designed to point out violations and problem areas. Fiscal and personnel constraints limit the number of violations and problem areas that can be effectively pursued. Staff resources are, therefore, directed to those discharges which are determined to be of sufficient importance by the priority ranking formula.

Provisions of the State construction and operation permit program also require that certain agricultural operations also obtain a permit for wastewater disposal. This subject is discussed in Chapter VII. Industries which discharge their wastewater to municipal plants do not need an operation permit, but must follow certain pre-treatment standards as published by EPA.

Operation permits are written for a maximum of five years, with renewal application required prior to expiration. A permit can be modified at any time if there is a violation of any terms or condition of the permit, a change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge, or if it is found that the permit was obtained under any type of misrepresentation of fact.

Many dischargers are not currently treating their wastewaters to a sufficient degree to comply with the final effluent limitations of their permit. In these cases the permits are written with interim and final effluent limitations and legally enforceable compliance schedules. These compliance schedules usually specify a series of interim dates so as to assure steady progress on the remedial efforts. The final compliance date, however, is not later than July 1, 1977.

Iowa water pollution control law provides for stiff penalties for violations of permits and other rules or standards. A large bulk of the DEQ compliance action work load is directed toward negotiating corrections. Negotiations are aimed at identifying practical remedial measures. Legal enforcement actions follow only where negotiations are not effective.

Water Quality Management Deadlines

As already mentioned, this document will help to direct the water quality management strategies necessary to implement a remedial program needed to meet the goals of the Act. The Act and the DEQ specify several deadlines that must be met in the implementation of this management program. Several key dates which have been established both by the EPA and the DEQ for improving wastewater treatment to protect National and State water quality follow. These dates are used to establish implementation schedules for the remedial measures defined by this plan.

Date	Action
December 31, 1974	National Pollutant Discharge Elimination System permits issued.
June 30, 1975	Section 303(e) basin plans completed.
July 1, 1977	Secondary treatment required for all publicly-owned treatment works.
July 1, 1977	Best practicable waste treatment technology for all industrial discharges.
July 1, 1977	More stringent effluent limits to meet Iowa water quality standards.
July 1, 1983	Best practicable waste treatment technology for all publicly-owned treatment works.
July 1, 1983	Best available technology for all industrial discharges.
July 1, 1985	Zero pollutant discharge.

Construction Grants

If all point source dischargers are to meet the effluent limitations imposed by the waste load allocations, considerable monetary expenditures will be required on behalf of municipalities and industries. Industrial dischargers must provide their own waste treatment financing. The Federal Water Pollution Control Act Amendments of 1972, under Title II - "Grants for Construction of Treatment Works" provide for federal grants for publicly owned wastewater treatment facilities. Municipalities may apply to the EPA through the DEQ for federal grants of 75% of eligible costs of their wastewater treatment works improvements. Municipalities must then provide from other sources, the remaining 25% of the cost. Eligible project costs include those for treatment, interceptors, and collection facilities.

Collection facilities have been assigned lowest priority.

In the past, federal funds allocated to Iowa had been sufficient to cover the grant funding of all needed treatment facilities, however, during the past two years the needs have outgrown the availability of federal funds. Nationwide federal allotments for fiscal years 1974 and 1975 were $3 billion and $4 billion, respectively. Of the national allotment, Iowa's shares were $34.7 million and $39.3 million respectively. Current needs for the State for all eligible facilities excluding storm sewers, based on 1973 dollars is $989,584,000, as contained in the 1974 "Needs Survey" for the State of Iowa. These needs will continue to increase as better information is developed through the waste load allocations and basin planning processes. Inflation is also having a significant influence on treatment facility costs.

Priorities for Funding - To receive grant funding a municipality must proceed through certain requirements. The DEQ is responsible for establishing an orderly priority process for the administration and obligation of federal grant funds. All municipalities are placed on the State discharge inventory and assigned a discharge priority. Should a municipality have a need for improvement or construction of wastewater treatment facilities and apply for federal grant funds, it is then placed in the construction grant priority listing according to its discharge priority rank. The construction grant priority list is revised annually. After determination of the available federal grant money for the year, the annual project list can be established based upon the number of projects from the priority list that can be funded.

Prior to adoption of the annual "priority list" and "project list" for each fiscal year, a public hearing is held where interested persons may voice objections to the proposed lists. Following consideration of public hearing comments the final lists are prepared and approved by the Water Quality Commission and the EPA.

Types of Grants - Once a municipality has been placed upon the "project list" and has been found to be eligible for grant funding, a three-step grant process is initiated in accordance with Federal Regulations 40 CFR 35, promulgated by EPA to implement Title II of the Federal Act.

Step one, known as the facility plan, contains an evaluation of the water pollution control problem; explores a number of alternatives to eliminate the problem; conducts a cost-effectiveness study for each alternative; evaluates the environmental impact of each alternative; and finally, chooses the specific alternatives which seem to have the most environmental, economic, and social benefits. The facility plan must be submitted to the DEQ and the EPA for approval before the second step can be considered.

Step two covers the preparation of construction plans and specifications which are based on the alternative chosen in the facility plan. After approval of the plans and specifications by the DEQ and the EPA, step three, which is the actual construction of the required facilities, can be initiated. Grants are made to applicants for each of the three steps.

Before the facility planning (Step 1) process is begun, the DEQ will inform the applicant of the minimum quality of effluent which can be discharged to the receiving waters. The facility planning for a specific discharge is then directed at meeting these effluent limitations.

Priority System

Application of the waste load allocations and effluent limitations result in considerable needs to upgrade or expand existing wastewater treatment facilities. Although there is considerable expense involved to meet State and Federal water quality goals, the financial resources available each year for publicly owned facilities are limited. Not all needed projects can be funded at once. To solve this problem, a system of priorities has been established, This section describes a portion of the system proposed for use by the State of Iowa.

Stream Segment Priority Ranking - Each major river basin is first divided into various stream segments. Each stream segment consists of surface waters that have common hydrologic characteristics and natural, physical, chemical, and biological processes. In accordance with EPA guidelines, the stream segments must be classified either effluent limits (EL) or water quality limited (WQ).

Segment classification is a contributing factor in the determination of the segment ranking, discharger ranking, and compliance scheduling. The two segment types are described as follows:

1. An effluent limited (EL) segment is any segment where it is known that water quality is meeting and will continue to meet standards, or where there is adequate demonstration that standards will be met after application of secondary treatment or BPT to all point discharges to the segment.
2. A water quality limited (WQ) segment is any segment where it is known that water quality does not currently meet applicable standards and it is not expected that standards would be met even after application of secondary treatment or BPT to all point discharges to the segment.

All segments are next ranked in order of abatement priority. The ranking methodology attempts to take into account: (1) severity of pollution problems, (2) population affected, (3) need for preservation of high quality water, and (4) national priorities.

Two major concepts were considered necessary and sufficient to distinguish any segment from other segments of the basin. These are: (1) the degree of usefulness of the segment, assuming water quality standards are met, and

(2) the number of discharges required to meet effluent limitations in order to bring the segment into compliance with water quality standards. These concepts, thus, form the basis of the ranking methodology.

The specific formula used to calculate the total points for a segment is as follows:

$$\text{TOTAL SEGMENT POINTS} = (0.5 + A + B_c + B_w + C + BC + AES + POP) \times SQ$$

Where: A = 2 if the segment contains any designated class A waters and 0 otherwise.

B_C = 2 if the segment contains any designated Class B cold waters and 0 otherwise.

B_W = 1 if the segment is designated as a class B warm waters and 0 otherwise.

C = 2 if the segment contains any designated class C waters and 0 otherwise.

BC = 1 if the segment is designated as being useful for either boating and/or canoeing and 0 otherwise.

AES = 1 if the segment is considered to include an area of significant aesthetic value and 0 otherwise.

$$POP = \begin{bmatrix} 2.0 \\ 1.5 \\ 1.0 \\ 0.5 \\ 0 \end{bmatrix} \text{ if } \begin{bmatrix} \text{30 or more} \\ \text{15 to 30} \\ \text{5 to 15} \\ \text{0.5 to 5} \\ \text{0 to 0.5} \end{bmatrix} \text{ thousand people reside}$$

within a 10 mile wide corridor adjacent to either side of the segment and at least one of the above terms (A, B_C, B_W, C, BC, or AES) is nonzero.

SQ = 6 if the segment is designated as water quality limited and more than four dischargers have a waste load allocation more stringent than secondary treatment.

SQ = 5 if the segment is designated as water quality limited and three or four dischargers in the segment have a waste load allocation more stringent than secondary treatment.

SQ = 4 if the segment is designated as water quality limited and one or two dischargers in the segment have a waste load allocation more stringent than secondary treatment.

SQ = 3 if the segment is designated as effluent limited with water quality standards violated.

SQ = 2.5 if the segment is designated as effluent limited with water quality standards met.

SQ = 2 if the pollution load to the segment is contributed equally by point and nonpoint sources.

SQ = 1 if the pollution load to the segment is predominantly from nonpoint sources.

The formula for total segment points contains two factors. The first factor allocates points for the degree of usefulness of the segment. It is felt that the population that uses, or would use, the waters of a segment are those most affected by any pollution problems in the segment and further, that this population increases in direct proportion to the potential usefulness of the segment.

The intent of allowing the points of terms A, B_c, B_W, C, BC, and AES, which designates specific water uses, is obvious. The term POP is included to provide additional points when a segment has any of the above uses, since any usefulness is considered to be of somewhat greater value if a large population resides nearby. The constant term of .5 is included so the product of factors cannot be zero.

The second factor allocates a varying number of points based on whether the segment is designated as effluent limited or water quality limited. The highest level of points is given to segments which have a large number of discharges required to meet waste load allocations more stringent than secondary treatment or BPT to bring the segment into compliance with water quality standards. The scale of points for this factor basically gives an increasing amount of points in those areas where the greatest degree of point source pollution exists.

The total points for a segment are determined from a product of the points earned in each of the two factors. The formula was written in the form of a product so as to give low total points if either factor was low, and high points only if both factors are high. In this manner the formula weighs both the degree of usefulness of a segment and the severity of the pollution problem.

After the total points are determined for each segment in the basin, the segments are then ranked in decreasing order of points. The number one ranked segment is the segment receiving the most total points.

Following the segment ranking, abatement priority points are assigned to each segment. The abatement points are used as a factor in the Municipal discharger ranking which is discussed later. The abatement priority points are determined as follows:

ABATEMENT
PRIORITY = Total number of segments + 1 - Segment Rank
POINTS in the basin

The selected stream segments for the Iowa-Cedar basin are detailed in Chapter VI. Total segment points, segment rank, and abatement priority points are also presented in the chapter.

Municipal Discharger Ranking Methodology - In compliance with 40 CFR 130.43, which states that significant municipal dischargers shall be ranked to be subsequently used in establishing priorities and output estimates for municipal facilities construction, the following discharger ranking methodology has been promulgated for the Iowa-Cedar River Basin Plan. This ranking methodology is also in collaboration with current EPA Basin Plan Guidelines (Part IV, para. c) which states that significant municipal dischargers should be ranked in order of abatement priority.

This methodology ranks the municipal discharges in order of significance based on the following criteria:

1. A means of indicating the relative magnitude of one discharger with respect to all other dischargers.

2. A means of accounting for the present effluent quality of the dischargers.

3. A means of indicating the relative magnitude of the discharger in comparison to the capacity of the stream segment at the point of discharge.

4. A means of indicating the relative magnitude of the discharger in comparison to the total waste load of all other dischargers to the stream segment.

5. A means of comparison of the relative merit of the stream segment, to which the municipality discharges, to other segments in the basin.

To incorporate these criteria in the ranking methodology, the following factors were considered and evaluated. It should be noted that the numbering of the factors corresponds to that of the preceding criteria.

1. Total pounds of BOD_5 and ammonia-N presently being discharged using average reported flows.

2. Discharger's present BOD_5 and ammonia-N concentrations as reported through EQAP.

3. Discharger's present BOD_5 and ammonia-N waste load compared to the stream capacity.

4. Discharger's present BOD_5 and ammonia-N waste load compared to the total waste load from all dischargers to the stream segment.

5. Stream segment abatement priority points into which the municipality discharges.

Sufficient data is readily available to assess the degree of significance of a municipal discharger in terms of factors 1, 2, and 3. Likewise the stream segment abatement priority points, as indicated in factor 5, have previously been determined, however, the selection and manipulation of required data needed to comply with factor 4 is considerably more difficult due to the non-coincidental cause and effect nature of certain discharged pollutant materials. Thus a blending of factors 3 and 4 was deemed the most feasible alternative. This was accomplished by comparing the discharger's present BOD_5 and ammonia-N waste load to the respective values allowed for the discharger under its waste load allocation. This comparison was felt reasonable and justified since the calculations performed in determining waste load allocations take into account both stream capacities and other discharger's waste loads.

This methodology thus ranks a discharge with respect to its relative share of the waste load to the segment, as well as to the waste load the discharger contributes at its present degree of treatment. This rationale also takes into account population equivalency in lieu of just the contributing population, the relative overloading of the stream segment as determined by waste load allocations analysis, and the relative ranking of the stream segments as determined by the segment ranking methodology.

The specific formula used to rank dischargers is as follows:

$(A_1 + D_1)\ B_1 + (A_2 + D_2)\ B_2 + C =$ Discharger priority points.

The discharger ranking formula consists of four elements which attempt to incorporate the criteria described above. The four elements are as follows:

Element A: Present Effluent Discharge;

$$A_1 = \begin{bmatrix} 60 \\ 50 \\ 40 \\ 30 \\ 20 \\ 10 \\ 1 \end{bmatrix} \text{ if the present } BOD_5 = \begin{bmatrix} >60 \text{ mg/l} \\ 60\text{-}50.1 \\ 50\text{-}40.1 \\ 40\text{-}30.1 \\ 30\text{-}20.1 \\ 20\text{-}10.1 \\ 10\text{-}\ 0 \end{bmatrix}$$

$$A_2 = \begin{bmatrix} 60 \\ 50 \\ 40 \\ 30 \\ 20 \\ 10 \\ 1 \end{bmatrix} \text{ if the present } NH_3\text{-}N = \begin{bmatrix} >40 \text{ mg/l} \\ 40\text{-}30.1 \\ 30\text{-}23.1 \\ 23\text{-}15.1 \\ 15\text{-}\ 8.1 \\ 8\text{-}\ 2.1 \\ 2\text{-}\ 0 \end{bmatrix}$$

This element uses the present average reported BOD_5 and ammonia-N values as representative effluent values, (where possible).

Element B: Degree of stream overloading;

1. BOD Overloading Factor:

$$1 - \frac{\text{lbs. W.L.A.}}{\text{lbs. PRES}} = B_1$$

where: lbs.W.L.A. is the total lbs/day of BOD_5 allowed, as determined by the waste load allocation lb.

lbs. PRES is the average lbs/day of BOD_5 which is currently being discharged.

2. Ammonia-N Overloading Factor:

$$1 - \frac{\text{lbs. W.L.A.}}{\text{lbs. PRES}} = B_2$$

where: lbs. W.L.A. is the total lbs/day of NH_3-N allowed, as determined by the waste load allocation.

lbs. PRES is the average lbs/day of NH_3-N which is currently being discharged.

Note: B_1 and B_2 are only allowed to vary from zero to 1.00 in this methodology. All other values are set equal to zero.

Element C: The segment abatement priority points are used for element C.

Element D: Total contributing lbs. of BOD_5 and NH_3-N:

$$D_1 = \begin{bmatrix} 0 \\ 1 \\ 3 \\ 5 \\ 7 \\ 9 \\ 12 \\ 14 \\ 16 \\ 18 \\ 21 \\ 25 \end{bmatrix} \quad \text{if the present } BOD_5 = \begin{bmatrix} 1.5 \text{ or less} \\ 1.5 - 3 \\ 3 - 5 \\ 5 - 10 \\ 10 - 20 \\ 20 - 50 \text{ lbs.} \\ 50 - 100 \\ 100 - 250 \\ 250 - 750 \\ 750 - 1500 \\ 1500 - 2500 \\ 2500 \text{ or more} \end{bmatrix}$$

$$D_2=\begin{bmatrix}0\\1\\3\\5\\7\\9\\12\\14\\16\\18\\21\\25\end{bmatrix}\quad\text{if the present } NH_3\text{-}N=\begin{bmatrix}.75 & \text{or} & \text{less}\\ .75 & - & 1.5\\ 1.5 & - & 2.5\\ 2.5 & - & 5\\ 5 & - & 10\\ 10 & - & 25\\ 25 & - & 50\\ 50 & - & 125\\ 125 & - & 375\\ 375 & - & 750\\ 750 & - & 1250\\ 1250 & \text{or} & \text{more}\end{bmatrix}\text{ lbs.}$$

This element takes into account the actual waste load which the stream receives, instead of a representation of the actual population.

The relative position of each discharger is determined by its total points as calculated by the discharger ranking formula. The dischargers are finally ranked in decreasing order of discharger priority points. The ranking of municipal dischargers in the Iowa-Cedar basin, as well as the priority points for each discharger, are presented in Chapter VI.

REFERENCES

1. Supporting Document For Iowa Water Quality Management Plans, Iowa Department of Environmental Quality, Water Quality Management Division, Des Moines, Iowa, 1976.

CHAPTER II

EXISTING DEVELOPMENT PATTERNS

POLITICAL SUBDIVISIONS

The Iowa-Cedar River Basin includes thirty-five counties or parts thereof. Table II-1 lists those counties and the percent of their land area within the basin. Two hundred and seven incorporated communities are included within the basin boundaries. The 1970 total population of these incorporated municipalities was 580,519 people. Fifty-one cities had populations greater than 1,000. Thirteen cities had populations in excess of 5,000. Two cities, Cedar Rapids and Waterloo, had populations over 50,000. Figure II-1 shows the incorporated municipalities in the basin and Table II-2 summarizes their 1970 populations.

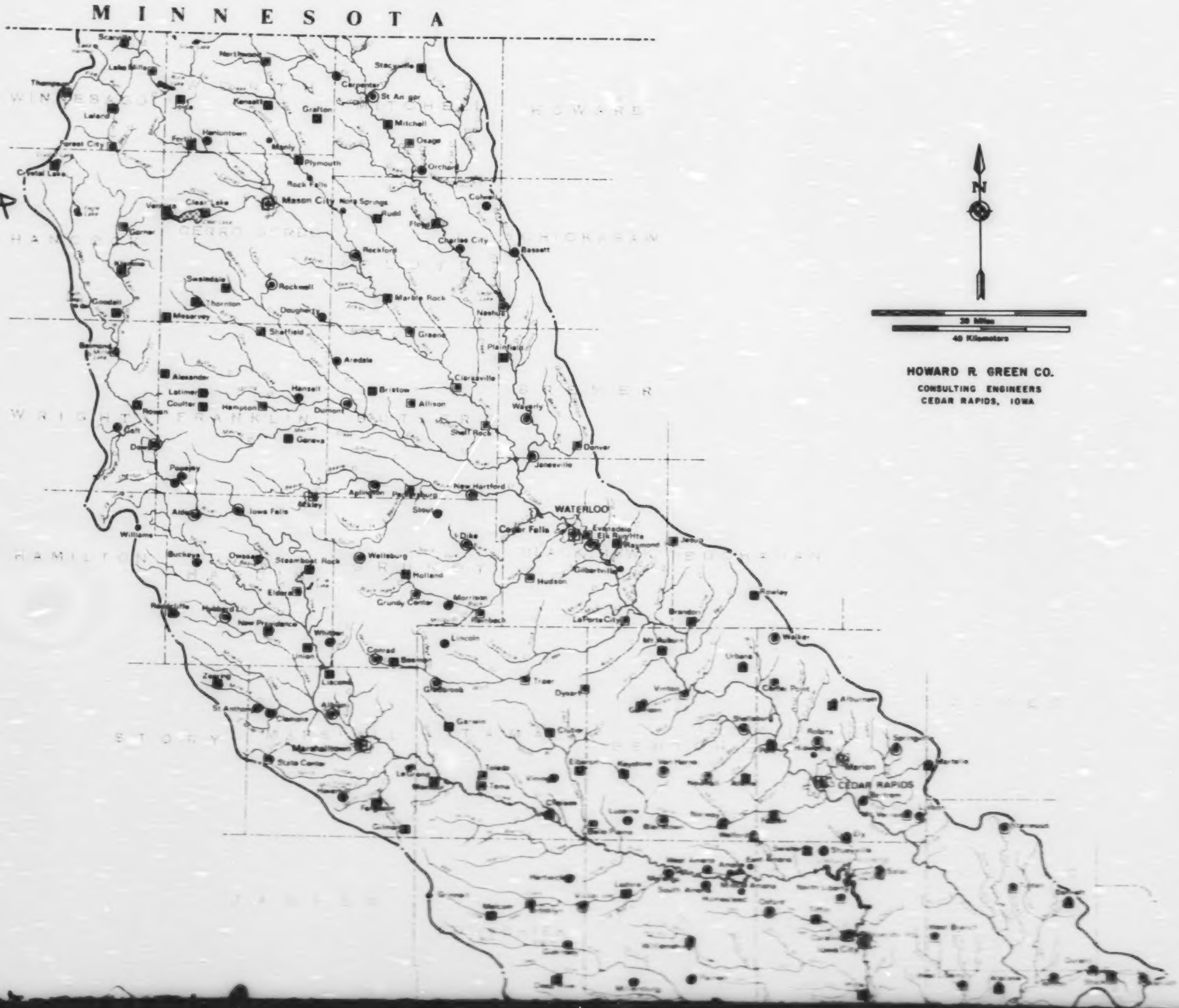
POPULATION PROJECTION

The DEQ has made population projections for those cities for the year 1990 based on the projections of Taylor (1). For those individual municipal projections not estimated by Taylor, the 1990 population of the community was estimated by multiplying its 1970 population by the ratio of the projected 1990 county population to the 1970 county population. The population projections for 1990 that were used for this study are indicated in Table II-2.

TABLE II-1

PORTIONS OF COUNTIES WITHIN THE IOWA-CEDAR RIVER BASIN

COUNTY	PERCENT OF COUNTY IN BASIN
Benton	100.0
Blackhawk	88.2
Bremer	46.3
Buchanan	24.5
Butler	100.0
Cedar	74.9
Cerro Gordo	100.0
Chickasaw	16.2
Des Moines	79.0
Floyd	99.4
Franklin	100.0
Grundy	100.0
Hamilton	14.6
Hancock	62.9
Hardin	98.1
Henry	1.5
Iowa	100.0
Jasper	1.2
Johnson	100.0
Jones	0.5
Keokuk	16.6
Linn	80.8
Louisa	75.3
Mahaska	0.3
Marshall	81.8
Mitchell	87.2
Muscatine	65.7
Poweshiek	76.4
Scott	6.4
Story	13.2
Tama	100.0
Washington	53.1
Winnebago	50.3
Worth	100.0
Wright	37.5

MINNESOTA
WINNEBAGO
HANCOCK
CERRO GORDO
WRIGHT
FRANKLIN
BUTLER
HAMILTON
HARDIN
GRUNDY
STORY
MARSHALL
TAMA
BENTON
HOWARD
CHICKASAW
BREMER
BUCHANAN
BLACK HAWK
JASPER
LINN
Scarville
Lake Mills
Thompson
Leland
Forest City
Crystal Lake
Northwood
Kensett
Grafton
Carpenter
St Ansgar
Stacyville
Mitchell
Osage
Orchard
Manly
Plymouth
Rock Falls
Hanlontown
Fertile
Mason City
Nora Springs
Rudd
Floyd
Charles City
Colwell
Bassett
Ventura
Clear Lake
Garner
Rockford
Rockwell
Swaledale
Thornton
Meservey
Goodell
Dougherty
Marble Rock
Nashua
Sheffield
Greene
Plainfield
Aredale
Alexander
Latimer
Coulter
Hansell
Bristow
Clarksville
Allison
Hampton
Dumont
Waverly
Rowan
Galt
Dows
Geneva
Shell Rock
Denver
Janesville
Popejoy
Ackley
Aplington
Parkersburg
New Hartford
Iowa Falls
Alden
Williams
Stout
WATERLOO
Cedar Falls
Evansdale
Elk Run Heights
Raymond
Jesup
Dike
Buckeye
Owasa
Steamboat Rock
Wellsburg
Holland
Eldora
Grundy Center
Morrison
Reinbeck
Hudson
Gilbertville
La Porte City
Brandon
Rowley
Walker
Radcliffe
Hubbard
New Providence
Whitten
Union
Conrad
Beaman
Lincoln
Mt Auburn
Urbana
Zearing
Liscomb
Gladbrook
Traer
Dysart
Vinton
Center Point
Alburnett
St Anthony
Clemons
Albion
Garwin
Shellsburg
Marshalltown
State Center
Toledo
Tama
Elberon
Keystone
Van Horne
Marion
Springville
Martelle
CEDAR RAPIDS
Le Grand
Chelsea
Luzerne
Belle Plaine
Norway
Atkins
Fairfax
Ely
Shueyville
Swisher
West Amana
South Amana
Marengo
North Liberty
Oxford
Tiffin
Iowa City
West Branch
Grinnell
N
20 Miles
40 Kilometers
HOWARD R. GREEN CO.
CONSULTING ENGINEERS
CEDAR RAPIDS, IOWA

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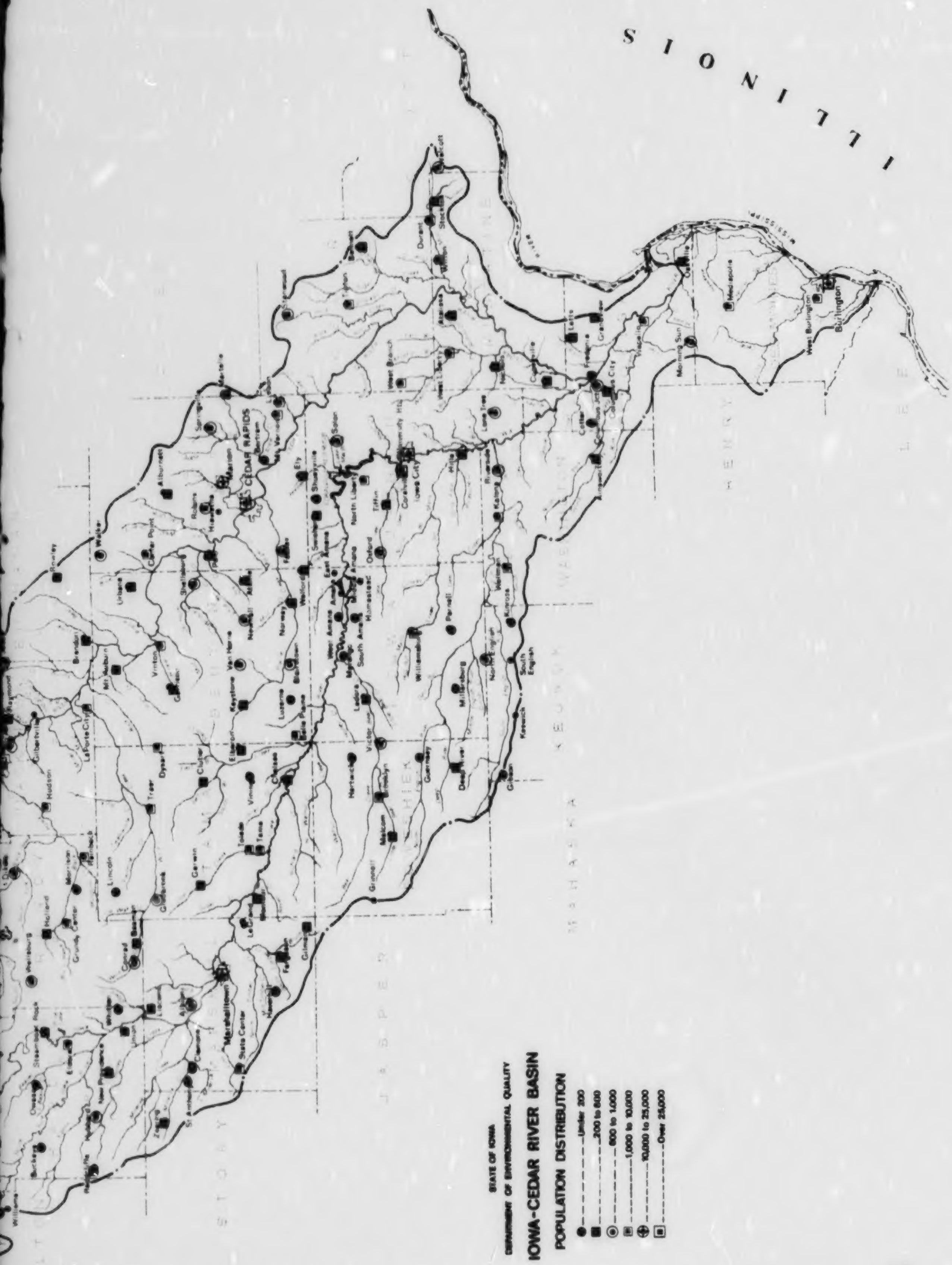

STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN
POPULATION DISTRIBUTION
● Under 200
■ 200 to 600
◎ 600 to 1,000
▣ 1,000 to 10,000
⊕ 10,000 to 25,000
⊡ Over 25,000
ILLINOIS
Mississippi River
CEDAR RAPIDS
Iowa City
Marshalltown
Burlington
West Burlington
Mediapolis
Muscatine
Wapello
Columbus Junction
Morning Sun
Tipton
Stanwood
West Branch
West Liberty
Lone Tree
Solon
Mt. Vernon
Marion
Hiawatha
Robins
Alburnett
Center Point
Urbana
Shellsburg
Vinton
Walker
Ryan
Brandon
Mt. Auburn
LaPorte City
Gilbertville
Hudson
Reinbeck
Morrison
Holland
Grundy Center
Wellsburg
Conrad
Beaman
Steamboat Rock
Eldora
Whitten
Union
New Providence
Albion
State Center
Colo
Zearing
St. Anthony
Tama
Toledo
Montour
Chelsea
Belle Plaine
Garwin
Gladbrook
Lincoln
Traer
Dysart
Clutier
Elberon
Keystone
Van Horne
Luzerne
Blairstown
Newhall
Norway
Fairfax
Walford
Swisher
Shueyville
Ely
North Liberty
Tiffin
Oxford
Coralville
Amana
East Amana
Middle Amana
West Amana
South Amana
Homestead
Marengo
Ladora
Victor
Brooklyn
Hartwick
Malcom
Grinnell
Montezuma
Deep River
Guernsey
Parnell
Williamsburg
Millersburg
North English
South English
Keswick
Gibson
Kalona
Riverside
Hills
Wellman
Keota
Durant
Stockton
Walcott
Letts
Grandview
Fredonia
Conesville
Nichols
Wilton
Bennett
Buckeye
Williams
Radcliffe
Iowa Falls
Oxford Junction
Grand River
JASPER
STORY
HAMILTON
KEOKUK
MAHASKA
WASHINGTON
HENRY
LEE
POWESHIEK
IOWA
TAMA
BENTON
CEDAR
MUSCATINE
LOUISA
DES MOINES

B

FIGURE II-1

TABLE II-2

EXISTING AND PROJECTED POPULATIONS (After Taylor (1))

TOWN	COUNTY	POP. 1970	POP. 1990
Ackley	Hardin	1,794	2,100
Ainsworth	Washington	455	455
Albion	Marshall	772	1,100
Alburnett	Linn	418	650
Alden	Hardin	876	876
Alexander	Franklin	249	252
Allison	Butler	1,071	1,600
Aplington	Butler	936	1,079
Aredale	Butler	126	145
Atalissa	Muscatine	244	352
Atkins	Benton	581	692
Bassett	Chickasaw	152	171
Beaman	Grundy	222	263
Belle Plaine	Benton	2,810	3,300
Belmond	Wright	2,300	2,800
Bennett	Cedar	385	404
Bertram	Linn	177	274
Blairstown	Benton	612	729
Brandon	Buchanan	432	483
Bristow	Butler	230	265
Brooklyn	Poweshiek	1,410	1,700
Buckeye	Hardin	143	143
Burlington	Des Moines	32,400	32,400
Carpenter	Mitchell	122	126
Cedar Falls	Black Hawk	29,606	43,100
Cedar Rapids	Linn	110,642	118,600
Center Point	Linn	1,456	1,700
Charles City	Floyd	9,269	11,400
Chelsea	Tama	381	403
Clarksville	Butler	1,360	1,600

TABLE II-2 (CONTINUED)

TOWN	COUNTY	POP. 1970	POP. 1990
Clear Lake	Cerro Gordo	6,876	7,500
Clemons	Marshall	178	254
Clutier	Tama	275	291
Columbus City	Louisa	312	399
Columbus Junction	Louisa	1,200	1,900
Colwell	Floyd	100	124
Conesville	Muscatine	295	426
Conrad	Grundy	932	1,103
Coralville	Linn	6,130	10,900
Cotter	Louisa	55	70
Coulter	Franklin	262	265
Crystal Lake	Hancock	276	302
Deep River	Poweshiek	323	331
Denver	Bremer	1,169	2,000
Dike	Grundy	794	939
Dougherty	Cerro Gordo	135	146
Dows	Wright	777	777
Dumont	Butler	724	834
Durant	Cedar	1,472	2,000
Dysart	Tama	1,300	1,700
Elberon	Tama	203	215
Eldora	Hardin	3,223	3,500
Elk Run Heights	Black Hawk	1,175	1,300
Ely	Linn	275	428
Evansdale	Black Hawk	5,038	5,038
Fairfax	Linn	635	988
Ferguson	Marshall	203	290
Fertile	Worth	394	460
Floyd	Floyd	380	470
Forest City	Winnebago	3,841	6,400
Fredonia	Louisa	162	215
Galt	Wright	50	50
Garner	Hancock	2,200	3,900
Garrison	Benton	383	456
Garwin	Tama	563	596

TABLE II-2 (CONTINUED)

TOWN	COUNTY	POP. 1970	POP. 1990
Geneva	Franklin	201	204
Gibson	Keokuk	80	93
Gilbertville	Black Hawk	653	933
Gilman	Marshall	513	732
Gladbrook	Tama	961	1,017
Goodell	Hancock	218	252
Grafton	Worth	254	296
Grandview	Louisa	357	457
Greene	Butler	1,363	1,700
Grinnell	Poweshiek	8,400	11,600
Grundy Center	Grundy	2,712	3,208
Guernsey	Poweshiek	94	96
Hampton	Franklin	4,376	5,700
Hanlontown	Worth	182	272
Hansell	Franklin	124	127
Hartwick	Poweshiek	101	106
Haverhill	Marshall	160	228
Hiawatha	Linn	2,416	5,200
Hills	Johnson	507	785
Holland	Grundy	258	305
Hubbard	Hardin	846	846
Hudson	Black Hawk	1,535	2,606
Iowa City	Johnson	46,850	65,000
Iowa Falls	Hardin	6,454	8,700
Janesville	Bremer	741	800
Jesup	Buchanan	1,662	2,300
Joice	Worth	201	235
Kalona	Washington	1,488	2,100
Kensett	Worth	361	422
Keswick	Keokuk	257	274
Keystone	Benton	549	654
Kinross	Keokuk	97	113
Klemme	Hancock	533	616
Ladora	Iowa	321	357
Lake Mills	Winnebago	2,124	3,300

TABLE II-2 (CONTINUED)

TOWN	COUNTY	POP. 1970	POP. 1990
La Porte City	Black Hawk	2,256	2,256
Latimer	Franklin	393	396
LeGrand	Marshall	805	1,148
Leland	Winnebago	223	223
Letts	Louisa	434	560
Lincoln	Tama	184	195
Lisbon	Linn	1,343	1,400
Liscomb	Marshall	328	468
Lone Tree	Johnson	834	1,124
Luzerne	Benton	134	160
Malcom	Poweshiek	388	408
Manly	Worth	1,294	1,600
Marble Rock	Floyd	461	570
Marion	Linn	18,028	24,500
Marshalltown	Marshall	26,219	29,200
Marengo	Iowa	2,235	2,600
Martelle	Jones	341	398
Mason City	Cerro Gordo	31,839	33,900
Mediapolis	Des Moines	1,200	1,400
Meservey	Cerro Gordo	354	391
Millersburg	Iowa	187	208
Mitchell	Mitchell	233	240
Montour	Tama	334	353
Morning Sun	Louisa	906	1,111
Morrison	Grundy	136	161
Mt. Auburn	Benton	200	238
Mt. Vernon	Linn	3,018	3,500
Nashua	Chickasaw	1,712	2,000
Newhall	Benton	701	835
New Hartford	Butler	690	795
New Providence	Hardin	208	208
Nichols	Muscatine	396	572
Nora Springs	Floyd	1,337	1,900
North English	Iowa	965	1,073
North Liberty	Johnson	1,055	1,507

TABLE II-2 (CONTINUED)

TOWN	COUNTY	POP. 1970	POP. 1990
Northwood	Worth	1,950	3,100
Norway	Benton	554	660
Oakville	Louisa	369	453
Orchard	Mitchell	115	118
Osage	Mitchell	3,815	4,500
Owasa	Hardin	69	69
Oxford	Johnson	666	951
Palo	Linn	430	669
Parkersburg	Butler	1,631	2,400
Parnell	Iowa	175	195
Plainfield	Bremer	446	481
Plymouth	Cerro Gordo	41	45
Popejoy	Franklin	147	147
Radcliffe	Hardin	548	548
Raymond	Black Hawk	582	828
Reinbeck	Grundy	1,711	2,024
Riverside	Washington	758	758
Robins	Linn	663	1,031
Rock Falls	Cerro Gordo	150	165
Rockford	Floyd	902	1,115
Rockwell	Cerro Gordo	942	1,040
Rowan	Wright	231	231
Rudd	Floyd	429	530
St. Ansgar	Mitchell	994	1,026
St. Anthony	Marshall	156	223
Scarville	Winnebago	81	81
Sheffield	Franklin	1,070	1,300
Shell Rock	Butler	1,159	1,600
Shellsburg	Benton	740	881
Shueyville	Johnson	187	267
Solon	Johnson	837	1,195
South English	Keokuk	218	234
Springville	Linn	970	1,509
Stacyville	Mitchell	598	617
Stanwood	Cedar	642	674

TABLE II-2 (CONTINUED)

TOWN	COUNTY	POP. 1970	POP. 1990
State Center	Marshall	1,232	1,500
Steamboat Rock	Hardin	394	394
Stockton	Muscatine	222	320
Stout	Grundy	196	232
Swaledale	Cerro Gordo	222	245
Swisher	Johnson	417	596
Tama	Tama	3,100	3,900
Thompson	Winnebago	600	600
Thornton	Cerro Gordo	410	453
Tiffin	Johnson	299	427
Tipton	Cedar	2,877	3,200
Toledo	Tama	2,400	2,900
Traer	Tama	1,700	2,200
Union	Hardin	484	484
University Heights	Johnson	1,265	1,800
Urbana	Benton	552	657
Van Horne	Benton	613	730
Ventura	Cerro Gordo	543	600
Victor	Iowa	949	1,055
Vining	Tama	71	75
Vinton	Benton	4,845	6,000
Walcott	Scott	989	1,129
Walford	Benton	286	341
Walker	Linn	622	968
Wapello	Louisa	1,900	2,400
Waterloo	Black Hawk	75,533	78,200
Waverly	Bremer	7,205	8,900
Wellman	Washington	1,068	1,068
Wellsburg	Grundy	754	892
West Branch	Cedar	1,322	2,000
West Burlington	Des Moines	3,100	3,600
West Liberty	Muscatine	2,296	3,000
Whitten	Hardin	194	194
Williams	Hamilton	456	456
Williamsburg	Iowa	1,807	2,300

TABLE II-2 (CONTINUED)

TOWN	COUNTY	POP. 1970	POP. 1990
Wilton	Muscatine	2,044	2,300
Zearing	Story	535	581

ECONOMICS

Information for this section, was obtained from the Upper Mississippi River Comprehensive Basin Study (2).

A brief economic profile for the Iowa-Cedar River Basin is given in Table II-3.

Labor Force

The labor force is expected to increase by more than 60 percent between 1960 and 2000 - about the same as the national change projected for the same period. The percent of population in the labor force follows the same pattern exhibited by other agricultural areas, a relatively high proportion of men and low proportion of women being in the labor force. These relative labor participation rates are expected to continue to the turn of the century.

Personal Income

Personal per capita income is expected to increase at about the same rate as the national average. As higher wage industries replace agriculture in the basin, per capita income is expected to move close to the national level by the year 2020. Total personal income is expected to be somewhat less than the national average between 1960 and 2020.

Employment

As shown in Table II-4, civilian employment in a selected area, as detailed

TABLE II-3

ECONOMIC PROFILE OF THE IOWA-CEDAR RIVER BASIN (2)

	Population, thousand			Personal Income	
	Total	Nonfarm	Farm	Total Income	Per Capita Income
Year	Number	Number	Number	Million 1960 Dollars	Dollars
1960	773	603	170	1,647	2,133
1980	1,048	916	132	3,824	3,649
2000	1,407	1,313	94	8,239	5,858
2020	1,959	1,878	81	18,002	9,168

Employment, thousand

Year	Total	Noncommodity Producing[a]	Commodity Producing[b]	Manufacturing Commodities	Nonmanufacturing Commodities
1960	272	158	114	58	56
1980	359	244	115	66	49
2000	478	364	114	75	39
2020	644	525	119	87	32

Employment for Selected Manufacturing Industries by SIC[d], thousand

Year	20 Food	28 Chem	29 Petrol Prod	32 Stone, Clay, Glass	33 Primary Metals	34, 35 Fabr Met & Nonelec Mach	Total
1960	17	2	(c)	2	1	21	43
1980	17	2	(c)	3	1	25	48
2000	17	2	(c)	3	1	27	50

Output (Value Added) for Selected Manufacturing Industries by SIC[d], million 1960 dollars

Year	20 Food	28 Chem	291 Petrol Ref	324 Hyd Cemt	33 Primary Metals	34, 35 Fabr Met & Nonelec Mach	Total
1960	218	38	--	28	6	241	531
1980	464	113	--	90	11	495	1,173

---

[a] Noncommodity group includes the following SIC categories: 15-17 Construction; 40-49 Transportation, Communications, and Public Utilities; 50 Wholesale Trade; 52-59 Retail Trade; 60-67 Finance, Insurance, and Real Estate; 70-89 Services; and 91-93 Government.

[b] Commodity group includes SIC categories: 01-09 Agriculture; 10-14 Mining; 19 Ordnance; 20 Food; 21 Tobacco; 22 Textiles; 23 Apparel; 24 Lumber; 25 Furniture; 26 Pulp and Paper; 27 Printing and Publishing; 28 Chemicals; 29 Petroleum Products; 30 Rubber and Plastics; 31 Leather Products; 32 Stone, Clay, and Glass; 33 Primary Metals; 34 Fabricated Metals; 35 Nonelectric Machinery; 36 Electrical Equipment; 37 Transportation Equipment; 38 Instruments; and 39 Miscellaneous Manufacturing and Other Manufacturing.

[c] Less than 500 employees.

[d] Standard Industrial Classification.

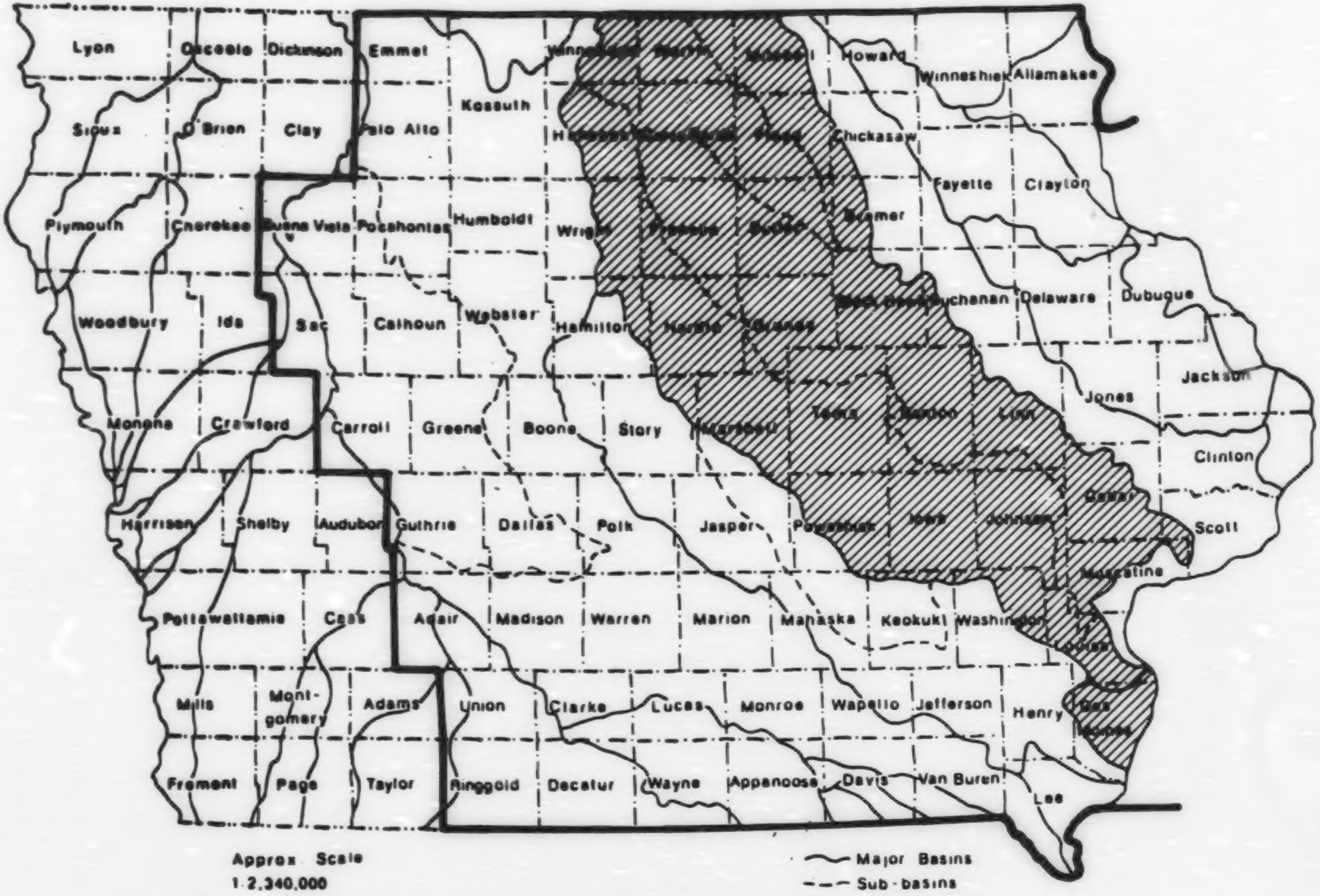
TABLE II-4

SUMMARY ECONOMIC DATA (2) FOR SELECTED AREA SHOWN IN FIGURE II-2

	Unit	1950	1960	1970	1980	1990	2000	2010	2020
Population	thousands	2,638	2,821	3,167	3,684	4,344	5,000	5,914	6,941
Students	thousands	39	46	84	112	124	136	--	--
Total, excluding students	thousands	2,599	2,775	3,083	3,572	4,220	4,864	--	--
Male	thousands	1,295	1,362	1,497	1,748	2,076	2,399	--	--
Female	thousands	1,305	1,413	1,586	1,825	2,144	2,466	--	--
Total, 15-69 yrs. excl. students	thousands	1,719	1,684	1,875	2,188	2,521	2,912	--	--
Male	thousands	851	819	849	1,068	1,240	1,436	--	--
Female	thousands	868	864	966	1,119	1,281	1,475	--	--
Total, excluding rural farm	thousands	1,898	2,188	2,608	3,194	3,921	4,638	5,576	6,628
Labor Force:									
Total	thousands	--	1,079	1,157	1,330	1,551	1,800	--	--
Male	thousands	--	751	778	894	1,043	1,211	--	--
Female	thousands	--	329	379	436	508	590	--	--
Labor Force Participation Rate:									
Total	percent	--	121.8	123.4	121.6	122.9	123.7	--	--
Male	percent	--	172.6	171.2	167.5	168.4	168.7	--	--
Female	percent	--	72.8	78.5	77.8	79.3	79.8	--	--
Employment (jobs):									
Total	thousands	974	1,012	1,164	1,350	1,573	1,811	2,138	2,492
Export	thousands	481	494	528	566	608	656	--	--
Residentiary	thousands	493	519	636	784	966	1,155	--	--
Total Employment (persons)	thousands	--	--	1,106	1,282	1,494	1,720	--	--
Unemployment Rate	percent	4.0	6.6	8.7	7.1	7.4	8.9	--	--
Personal Income:									
Total	mil. 1960 $	4,687	5,827	9,077	13,724	20,610	30,844	46,649	68,320
Wages and salaries	mil. 1960 $	3,387	3,925	6,119	9,189	13,831	20,730	--	--
Other Income	mil. 1960 $	1,300	1,903	2,958	4,535	6,778	10,114	--	--
Per capita	1960 $	3,555	4,130	5,731	7,450	9,486	12,329	15,762	19,653
Wages and salaries per employee	1960 $	6,957	7,751	10,509	13,616	17,583	22,885	--	--

FIGURE II-2

DATA BASE AREA FOR EMPLOYMENT STATISTICS


Lyon
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Worth
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Howard
Winneshiek
Allamakee
Sioux
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Clay
Palo Alto
Kossuth
Hancock
Cerro Gordo
Floyd
Chickasaw
Plymouth
Cherokee
Buena Vista
Pocahontas
Humboldt
Wright
Franklin
Butler
Bremer
Fayette
Clayton
Woodbury
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Calhoun
Webster
Hamilton
Hardin
Grundy
Black Hawk
Buchanan
Delaware
Dubuque
Monona
Crawford
Carroll
Greene
Boone
Story
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Tama
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Linn
Jones
Jackson
Clinton
Harrison
Shelby
Audubon
Guthrie
Dallas
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Major Basins
Sub-basins

in Figure II-4, which includes the Iowa-Cedar River Basin, is expected to reverse the decline of the 1950-60 period. In the period from 1960 to 2020, civilian employment will more than double to 1.2 million. This rate of increase is less than the projected national average.

Employment in industries exporting their goods or services from the area decreased in the 1950's, but is expected to increase in future decades. Residentiary employment is expected to increase at about twice the rate of export employment in the basin between 1960 and 2000. By the turn of the century it is expected that there will be nearly two residentiary industry employees for every export industry worker.

Agriculture in 1950 was the largest employer in this area, engaging 60 percent more workers than its nearest rival, services. In the 1950-60 period, agricultural employment declined by one-fifth, bringing it to a level of employment about the same as manufacturing and services. Agricultural employment is projected to decline further, while the other industries increase. Agriculture is expected to rank second or third in employment in the 1970's, fifth by the year 2000, and sixth by the year 2020. Agricultural employment will decrease from nearly one-third to less than one-twentieth of the region's workers between 1950 and 2020.

Manufacturing is expected to retain about one-seventh of the area's workers through the projected period. In the 1950-60 period, manufacturers of non-electric machinery replaced the food manufacturing industry as the major manufacturing employer. Electrical equipment, the third largest manufacturing employer, experienced a rapid increase in the 1950's, and by 1980 or 1990 this is expected to be the largest manufacturing industry in the area. The one other industry employing a relatively large and stable portion of manufacturing workers is the fabricated metals industry.

Mining employs few workers in the area and a significant increase is not expected. Retail trade employed about one-seventh of the total workers in the basin in 1960, and although the industry is expected to double its employment between 1960 and 2020, its share of regional employment will decline slightly. Services employment is expected to increase its 1960 level three and one-half to six times by the year 2020. Government, which is expected to increase by a factor of 5 to 6 during this interval, should rise from 4 to 11 percent of total employment. Finance, insurance, and real estate is also expected to increase its share of the basin's employment in the projected period, more than doubling its 1960 employment by 2020. Construction, wholesale trade and transportation-communications-public utilities are projected to grow slowly, the latter group having about the same number of employees in 2020 as in 1960. All three sectors are expected to represent an increasingly smaller share of the total employment force during the projected period.

RECREATIONAL ACTIVITIES

The Iowa-Cedar River Basin provides the opportunity for numerous water-related recreational activities. The following types of areas are suitable for recreational sites.

1. Hills with trees for nature observation, hiking and camping.
2. Lakes or streams for swimming, boating, water skiing, and fishing.
3. Flood plains and plateaus for organized sport activities.
4. A combination of the above as a game habitat.

A common consideration of all available county and city plans reviewed for the study was the concept of retaining land along rivers for conservancy belts. These are to be left in a natural state for recreational pursuits, such as hiking, and stream access.

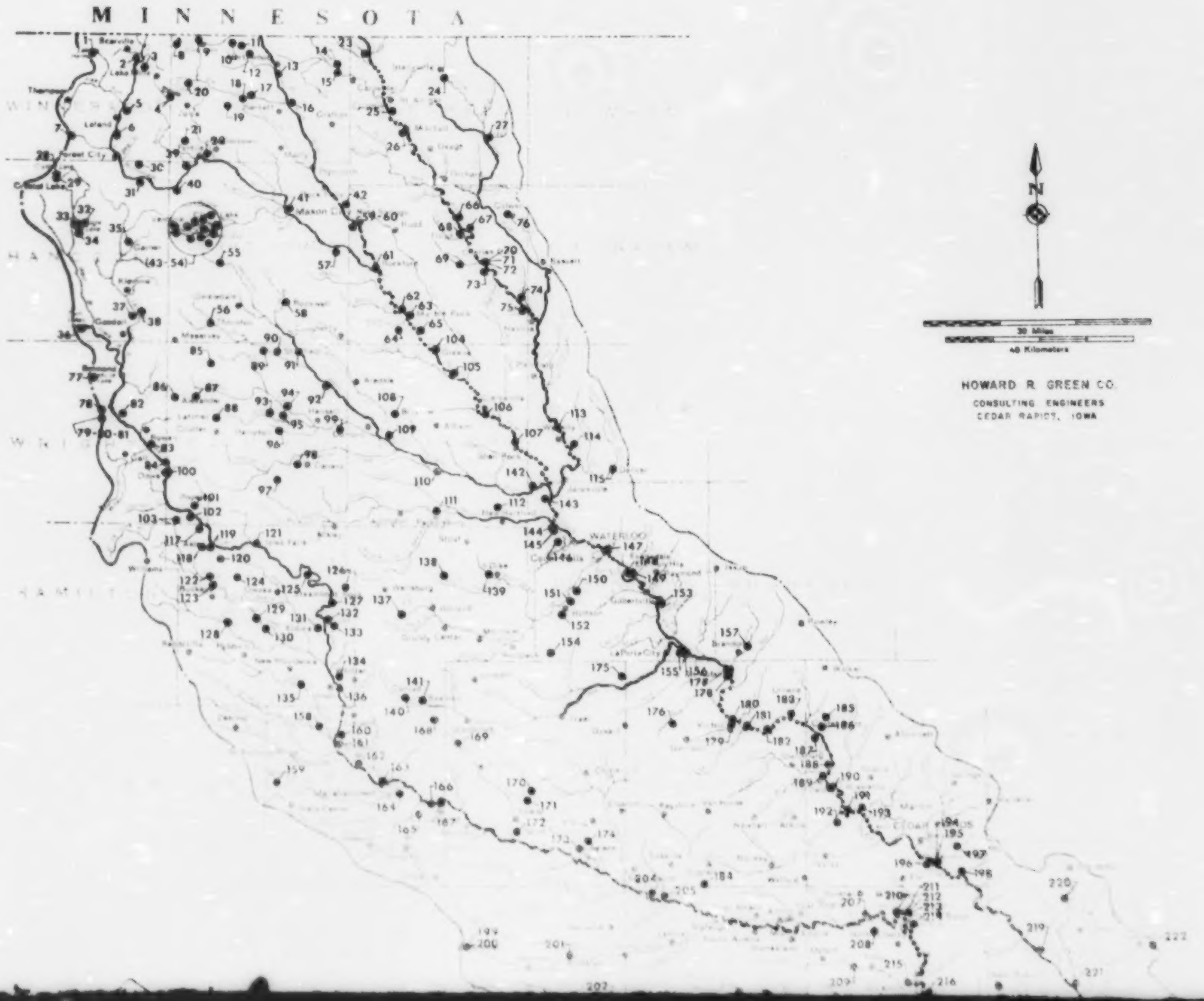
From a recreational standpoint, water must be of sufficient quality to support the propagation of desirable forms of fish and wildlife. Iowa "Class B" warm water standards should be adequate to satisfy this requirement (see Reference (4).) In areas where whole body contact with the water is permitted, "Class A" standards are required for public health reasons.

Figure II-3 shows the location of areas acceptable for boating activities in the Iowa-Cedar River Basin. In areas allowing power boats in excess of 10 horsepower, it is assumed that waterskiing (and swimming) would occur and that Class A standards should apply even though they may not now be in effect. Total or partial body contact with water would probably occur in areas not specifically designated. For example, body contact would generally occur in the canoeing regions. However, only those areas designated as whole body contact areas need to meet Class A standards.

Figure II-3 also shows the location of existing and proposed recreational sites in the river basin. Table II-5 lists data relative to each site.

High user densities at specific recreation sites in the Iowa-Cedar River Basin and at certain lakes can impart a high pollution load on the nearby groundwater and surface waters unless wastes are satisfactorily treated. Although many of the lakes are at present lightly developed, intense development will increase pollution potential. Proper planning of recreational and wastewater treatment facilities would control any adverse impact upon water quality.

D


MINNESOTA
WINNEBAGO
HANCOCK
WRIGHT
HAMILTON
Mason City
Forest City
WATERLOO
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CEDAR RAPIDS
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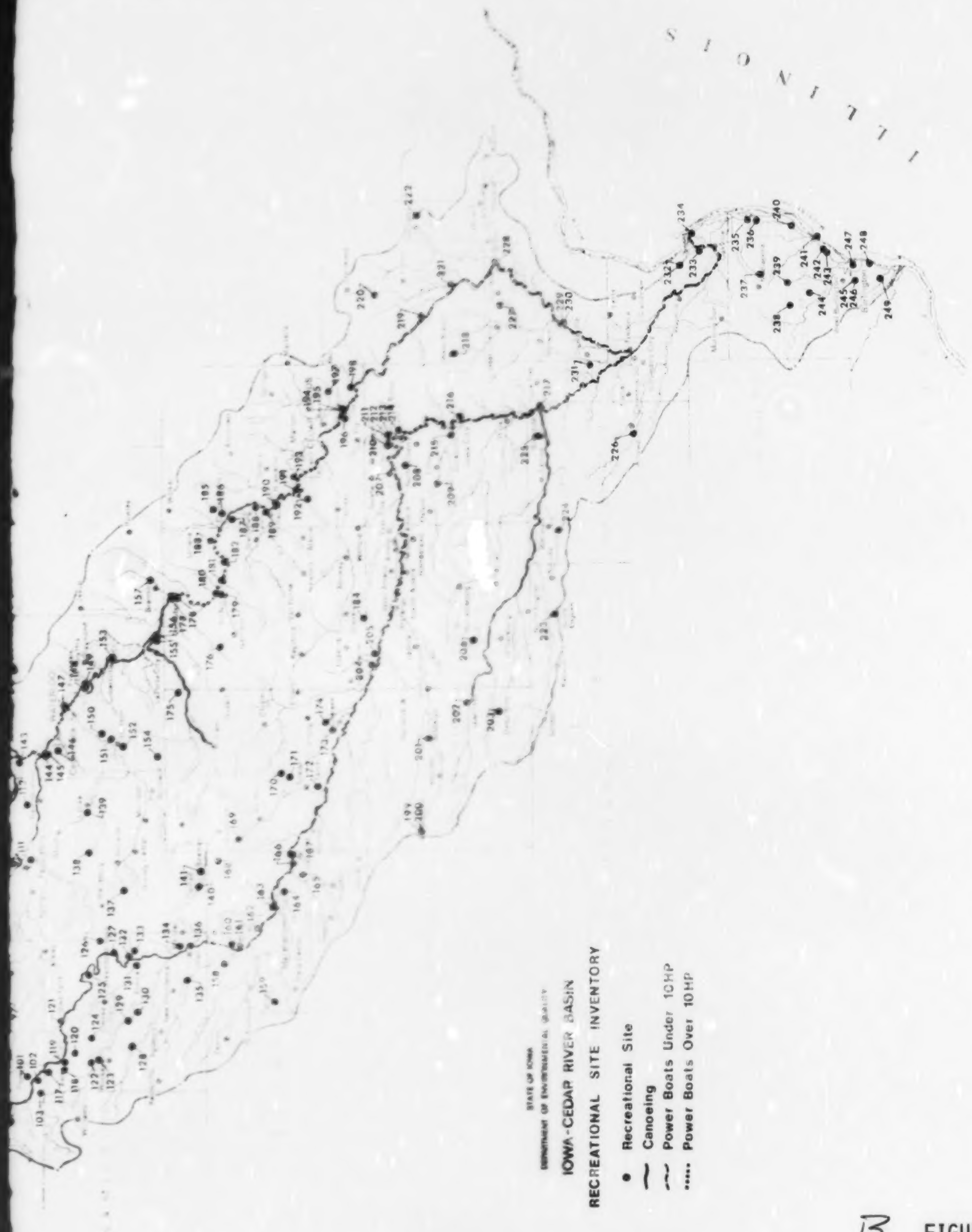
30 Miles
40 Kilometers
HOWARD R. GREEN CO.
CONSULTING ENGINEERS
CEDAR RAPIDS, IOWA

ILLINOIS
STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN
RECREATIONAL SITE INVENTORY
● Recreational Site
~ Canoeing
~ Power Boats Under 10HP
..... Power Boats Over 10HP
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B FIGURE II-3

TABLE II-5

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES			MAJOR ACTIVITIES									
				TOTAL AREA	LAND AREA	WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
1	Harmon Lake	State		483	72	411								*		
2	Dahle Pond	County		9	7	2					*				*	
3	Hogsback Area	County		149	149		*			*				*	*	
4	Rice Lake Rec. Area	State		1118	416	702		*	*		*	*		*	*	*
5	Winnebago River Rec. Area	County		47	47											
6	Ambroson Park	County		18	12	6					*			*	*	
7	Myre Slough	State		430	130	300								*		
8	Brights Lake	State		122		122								*		
9	Silver Lake Area & Access	State		448	109	339								*		
10	Christianson Taylor W.L.	County		25	25									*		
11	Hartland Forest	County		40	40									*		
12	Ochee Yahola Park	County		160	160											
13	Helgeland Wildlife Area	County		5	5									*		*
14	Deer Creek Game Area	County		40	40											
15	Deer Creek Forest	County		45	45									*		
16	Worth Co. Lake	County		8	5	3					*				*	*
17	Myre Timber	County		3	3									*		
18	Turvold Timber	County		32	32									*		
19	Stime Forest	County		165	165									*		
20	Elk Creek	State		1558	1035	523					*			*	*	
21	Brunsvold-Haugen Timber	County		19	19									*		
22	Fertile Mill Park	County		10	4	6		*	*		*				*	*
23	Otranto Park	County		5	5											
24	Stacyville Park	County		7	7											
25	Halvorson Park	County		11	11											

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES			MAJOR ACTIVITIES									
				TOTAL AREA	LAND AREA	WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
26	Interstate Park	County		25	5	20		*	*	*					*	*
27	Pioneer Area	County		14	14						*				*	
28	Crystal Lake	State		283		283		*			*					
29	Ellsworth Park	State		130	130			*	*	*	*				*	
30	Pilot Knob Park	State		369	349	20				*			*		*	
31	Wild Goose Park	County		62	62											
32	Eagle Lake Woodland	County		46	46									*		
33	Eagle Lake	State		920	5	915		*			*			*		
34	Eagle Lake Area	State		21	21					*			*		*	
35	Concord Park	County		2	2					*					*	
36	West Twin Lake	State		109		109					*			*		
37	Goodell Area	State		71	71									*		
38	Eldred-Sherwood Rec. Area	County		100	78	22				*	*				*	*
39	Mallard Marsh	County		227	227									*		
40	Kuhn Wildlife Area	County		78	78											
41	Averydale Access	County		6	6						*					
42	Shell Rock R.	County		454	451	3				*	*		*	*	*	
43	Clear Lake	State		3643		3643		*			*					*
44	Clear Lake State Park	State		92	92			*	*	*	*				*	
45	Clear Lake Access	State		7	7			*	*		*				*	
46	Clear Lake Outlet	State		1	1			*	*		*					
47	Lekwa Area	State		36	14	22								*		
48	Clear Lake Hatchery & Ponds	State		44	22	22										
49	South Shore Access	State		1	1			*	*		*					
50	McIntosh Woods	State		60	60			*	*	*					*	

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES			MAJOR ACTIVITIES									
				TOTAL AREA	LAND AREA	WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
51	Ventura Marsh	State		473	113	360		*	*		*			*		
52	Gerk Rec. Area	County		70	70											
53	Methodist Camp	Private														
54	Regular Baptist Camp	Private														
55	Zirbel Slough	County		130	130									*		
56	Ingebretson Park	County		23	23											
57	Clay Banks Forest	County		56	56						*			*		
58	Linn Grove Park	County		38	33	5				*	*				*	
59	Nora Springs Mill Dam	County		27	24	3		*	*		*				*	
60	Mathers Forest	County		50	49	1		*	*	*	*		*		*	
61	Rockford Park	County		18	16	2					*				*	
62	Winnebago Boy Scout Camp	Private														
63	Marble Rock Access	County		3	3			*	*		*					
64	Ackley Ck. Park	County		40	40					*					*	
65	Gates Bridge	County		4	4					*	*				*	
66	Idlewild Area	State		136	130	6		*	*	*	*			*		
67	Meyer Forest	County		102	102											
68	Floyd Park	County		4	4					*					*	*
69	Rotary Park	County		17	15	2										
70	River Dock	County		1	1			*	*		*					
71	County Museum	County		1	1											
72	Flora Ellis Wildlife Sanc.	County		10	10						*					
73	YMCA Camp Christy	Private														
74	Bunn's Woods	County		38	38											
75	Howard Woods	County		20	18	2		*	*	*	*				*	

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES			MAJOR ACTIVITIES									
				TOTAL AREA	LAND AREA	WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
76	Colwell Park	County		19	18	1				*	*				*	*
77	Morse Lakes	State		172	64	108		*	*		*			*		
78	Elm Lake	State		466	3	463								*		
79	Lake Cornelia	State		273		273										
80	Lake Cornelia Park	State		41	41			*	*	*	*				*	*
81	Eldridge Park	County		1	1						*				*	
82	Pikes Timber	County		46	46					*	*				*	
83	Bingham Park	County		12	11	1								*	*	
84	Dows Park	County		3	3									*	*	
85	Loomis Mem. Park	County		1	1					*					*	
86	Alexander Park	County		1	1					*					*	
87	Hawkins Game Area	County		1	1									*		
88	Latimer Cons. Park	County		3	3					*					*	
89	Sheffield Game Mgt. Area	County		16	14	2		*	*		*			*		
90	Galvin Park	County		6	6					*	*			*	*	
91	Zion-St. John Park	County		2	2					*					*	
92	West Fork Access	State		80	75	5					*			*	*	
93	Seeds Lake	State		319	189	130		*	*	*	*				*	*
94	Robinson Park	County		30	27	3				*	*		*	*	*	
95	WKW Park	County		54	54					*			*	*	*	
96	Fairgrounds Baseball Field	County		4	4											
97	Mallory Park	County		71	71					*			*	*	*	
98	Burkley Park	County		6	6					*				*	*	
99	Handorf Park	State		4	4					*					*	
100	Toft Park	County		13	8	5				*	*				*	*

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES			MAJOR ACTIVITIES									
				TOTAL AREA	LAND AREA	WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
101	Popejoy Park	County		67	63	4		*	*	*	*			*	*	
102	Oakland Valley Game Mgt. Area	County		2	2									*		
103	Oakland-Access	County		74	74						*			*		
104	Greene Rec. Park	County		1	1											
105	Camp Comfort	County		20	18	2										
106	Heery Woods	State		380	330	50					*		*		*	
107	Shell Rock Park	County		67	65	2										
108	Christian Service Church Camp	Private														
109	Considine Lake	County		90	78	12										
110	Big Marsh	State		2813	1763	1050					*			*		
111	Beaver Meadows Park	County		32	30	2										
112	Moore Rec. Area	County		35	35											
113	Cedar Bend Park	County		184	184					*	*		*		*	
114	Camp Inga-wanis	Private														
115	Brandt Park	County		10	9	1				*	*				*	
116	St. Pauls Lutheran School	Private														
117	Bigelow	County		10	10			*	*		*				*	
118	Bessman-Kemp Park	County		10	10			*	*	*	*				*	
119	Alden R. Access	County		1	1						*				*	
120	Steinberg Wildlife Area	County		3	3									*		
121	Nichols Wildlife Area	County		16	16										*	
122	Twin Elms Park	County		4	4						*			*		
123	Flowing Well Park	County		6	6						*				*	
124	Utech Wildlife Area	County		2	2											
125	Hardin City Access	State		25	25			*	*		*			*		

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES TOTAL AREA	ACRES LAND AREA	ACRES WATER AREA	MAJOR ACTIVITIES ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
126	Hartman Wildlife Area	County		10	10									*		
127	Steamboat Rock Access	State		5	5			*	*		*				*	
128	Gehrke Wildlife Area	County		6	6						*			*		
129	Boddy-Hunt Rec. Area	County		46	46											
130	Ziesman Wildlife Area	County		10	10						*			*		
131	Church of the Brethren Camp	Private														
132	Pine Lake	State		542	382	160		*	*	*	*	*	*		*	*
133	Pine Lake Baptist Camp	Private														
134	Lepley Mem. Park	County		9	9					*					*	
135	Reece Mem. Park	County		75	75					*	*		*		*	
136	Long Mem. Park	County		7	7			*	*	*	*				*	
137	Fishing Access	County		3	1	2					*				*	
138	Beaver Arboretum	County		1	1										*	
139	J.H. Roadman Mem. Park	State		10	8	2					*		*		*	
140	Conrad Lime Quarry	County		5	4	1					*					
141	Beaman Arboretum	County		5	5								*		*	
142	Thunderwoman Co. Park	County		96	92	4				*	*		*		*	
143	Washington Union Park	County		190	185	5					*			*		
144	Black Hawk Park	County		1093	1083	10		*	*	*	*		*		*	*
145	Falls Access	State		269	254	15		*	*	*	*			*	*	
146	George Wyth State Park	State		419	419			*	*	*	*		*		*	
147	Perry Canfield Park	County		40	40						*				*	
148	Casebeer Heights Access	County		20	20			*	*		*					
149	Elk Run Park	County		26	26										*	
150	Black Hawk Cr. Green Belt	County		351	349	2										

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES TOTAL AREA	 LAND AREA	 WATER AREA	MAJOR ACTIVITIES ARCHERY/GUN CLUB	 BOATING	 BOATING ACCESS	 CAMPING	 FISHING	 GOLF COURSE	 HIKING TRAILS	 HUNTING	 PICNICKING	 SWIMMING
151	Sargent Memorial Hwy. Wayside	County		4	4					*					*	
152	Popp Access	County		69	67	2					*			*	*	
153	Gilbertville Park	County		5	5			*	*	*	*				*	
154	Seyfer Access	County		4	4						*			*		
155	Cedar R. Access	County		27	27			*	*	*	*				*	
156	Indian Hills Access	State		138	138					*	*		*		*	*
157	Lime Cr. Area	County		39	38	1				*	*			*	*	
158	Bangor Public Square	County		2	2										*	
159	French Grove	County		28	28									*		
160	Grammer Grove W.A.	County		120	120					*	*				*	
161	Marshall Co. For. Res.	County		80	80						*			*		
162	Timmons Grove Park	County		198	191	7				*	*		*	*	*	
163	Nicholson Ford	State									*			*		
164	Fairgrounds Co. Park	County		2	2											
165	C.D. Coppock Park	County		9	9					*					*	
166	Three Bridges Park	County		12	12					*	*		*	*	*	
167	Holland Access	County		80	75	5					*			*		
168	Wolf Creek Rec. Area	County		93	93											
169	Union Grove	State		282	172	110		*	*	*	*		*		*	*
170	T.F. Clark Park	County		24	23	1										
171	Otter Cr. Park	County		277	208	69										
172	Manatt's Iowa R. Access	County		6		6		*	*		*				*	
173	Otter Creek Marsh	State		3009	2435	574								*		
174	Iowa R. Boat Access	County		1	1			*	*		*					
175	Hickory Hills Park	County		490	418	72		*	*	*	*		*		*	*

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES TOTAL AREA	ACRES LAND AREA	ACRES WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
176	Jct. 218 & 8 Wayside	State								*					*	
177	Mt. Auburn Bridge Area	County		160	160											
178	Minne Estma Park	State		60	60			*	*	*	*				*	
179	Dudgeon Lake	State		1257	1207	50		*	*		*			*		
180	Milroy Access	County		3	3						*				*	
181	Hoefle-Dulin Area	County		61	61			*	*	*	*				*	
182	Benton City Fry Access	County		40	40			*	*	*	*				*	
183	Wild Cat Bluff	County		119	119			*	*		*		*			
184	Hannen Park	County		180	130	50										
185	Wakema Park	County		4	4										*	
186	Lewis Bottoms	County		105	105			*	*		*		*		*	
187	Lewis	County		455	455						*					
188	Wickiup Hill	County		178	178			*	*	*	*		*	*		
189	Palo Marsh	County		113	113						*		*	*		
190	Chain Lake	County		95	95			*	*	*	*		*		*	
191	Squaw Creek Park	County		591	591											
192	Morgan Creek Park	County		104	104					*					*	
193	Rock Island	County		20	20											
194	Palisades Access	State		89	89			*	*	*	*		*	*	*	
195	Palisades-Kepler	State		599	589	10		*	*	*	*		*		*	
196	Palisades-Dows	County		162	162											
197	Abbe Creek School Museum	County		2	2										*	
198	South Cedar	County		162	160	2		*	*	*	*		*	*	*	
199	Arbor Lake Co. Park	County		37	37											
200	Fowler Mem. Field	County		4	4											

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES			MAJOR ACTIVITIES									
				TOTAL AREA	LAND AREA	WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
201	Brooklyn Rec. Area	County		7	7										*	
202	Guernsey Park	County		5	5										*	
203	Deep River Rec. Area	County		9	9											
204	Randolph Access	State		399	371	28		*	*		*			*		
205	Kozta Access	State		61	57	4								*		
206	Iowa Co. Park	County		299	207	92					*				*	*
207	Old State Quarry	County		8	8											
208	Swan Lake	State		44	44						*			*		
209	F.W. Kent Park	County		217	187	30				*				*	*	
210	Stainbrook Geological Preserves	County		23	23											
211	Hawkeye Wildlife Area	Federal		12195	10195	2000		*	*		*			*		
212	Ten Corps Area	Federal		100	100			*	*	*	*				*	*
213	Uncommitted	Federal		5040	2640	2400		*			*			*		
214	Lake MacBride State Park	Federal		1970	1020	950		*	*	*	*		*		*	*
215	Camp Cardinal	Private		14	14					*			*			
216	Plum Grove	State		4	4											
217	River Jct. Access	County		11	11											
218	Herbert Hoover Nat. H. Site	Federal		200	200								*		*	
219	Cedar Valley Green Belt	County		227	227			*	*		*					
220	Red Oak Park	County		7	7						*				*	
221	Rochester Area	County		3	3			*	*		*				*	
222	Bennett Park	County		75	65	10										
223	S. English Wayside	State								*					*	
224	Foster Woods	County		17	16	1					*		*	*	*	
225	Iowa Twp. Park	County		27	26	1									*	

TABLE II-5 (Cont.)

EXISTING AND PROPOSED RECREATION FACILITIES

NO.	NAME OF AREA	OWNERSHIP		ACRES TOTAL AREA	ACRES LAND AREA	ACRES WATER AREA	ARCHERY/GUN CLUB	BOATING	BOATING ACCESS	CAMPING	FISHING	GOLF COURSE	HIKING TRAILS	HUNTING	PICNICKING	SWIMMING
226	Marr Park	County		40	38	2				*					*	
227	Wiese Slough	State		1550	1294	256		*	*							
228	Moscow - Cedar R. Access	County		4	4			*	*	*	*				*	
229	Cedar River Access	State		652	652			*			*			*		
230	Salisbury - Cedar R. Access	County		74	74											
231	Cone Marsh	State		701	180	421								*		
232	Sand Run Access	Federal		3	3			*	*		*					
233	Toolesboro Access	Federal		4	4			*	*		*					
234	Ferry Landing Area	Federal		15	15			*	*	*	*				*	
235	Huron Slough	Federal		120	120						*		*	*		
236	Allen Green Refuge	State		152	112	40										
237	Chautauqua Park	County		10	10					*					*	
238	Franklin Twp. Artificial Lake	County		411	411									*		
239	Luckenbill Woods	County		32	32											
240	Casey Borrow Landing	Federal		1	1			*			*					
241	Lock & Dam No. 18	Federal						*			*					
242	Tama Beach	State		3	3			*	*	*	*				*	
243	Edgewater Access	State		2	2			*	*		*				*	
244	Zion School Museum	County		1	1											
245	Ordnance Plant	Federal		20	20										*	
246	Long Creek Cons. Club	Federal		10135	10000	135					*		*		*	
247	YMCA Camp	Private		83	10	73		*	*		*					
248	Hwy. 61 Wayside	State		6	6					*					*	
249	Hunts Woods	County		58	58					*			*	*	*	
250	Berends Wildlife Area	County		1	1											
251	Iowa River Greenbelt	County		771	771			*	*	*	*		*	*	*	

REFERENCES

1. *J. R. Taylor, Provisional Projections of the Population of Iowa Counties and Cities: 1975 to 1990*, Iowa State Department of Health.

2. *Upper Mississippi River Comprehensive Basin Study*, vol. VIII, appendix P: Economic Base Study and Projections, prepared by the Economic Advisory Committee, Upper Mississippi River Basin Coordinating Committee, 1970.

3. *Outdoor Recreation in Iowa* vol. V(b), Iowa Outdoor Recreation Guide, prepared by Planning and Coordination Section, Iowa Conservation Commission, July, 1972.

4. *Supporting Document for Iowa Water Quality Management Plans*, Iowa Department of Environmental Quality, 1976.

CHAPTER III

BASIN CHARACTERISTICS

The Iowa-Cedar River Basin is the second largest in the State, being exceeded in size only by the Des Moines River Basin. The headwaters of the Iowa originate in Hancock County, Iowa, with the headwaters of the Cedar in Dodge County, Minnesota. Both rivers flow in a southeasterly direction to the confluence of the Iowa River with the Mississippi River between Muscatine and Burlington, Iowa. (Fig.III-1). The total drainage areas of the Cedar and Iowa (including the Cedar) are 7,819 and 12,637 square miles respectively. (Table III-1). Ninety-two percent of the basin is located in all or part of 35 Iowa counties with the remainder in 4 Minnesota counties.

For the purposes of this report an area of direct Mississippi River tributaries, the Flint Creek Sub-basin, will be included. The sub-basin is located primarily in Des Moines County, Iowa and has a drainage area of 148 square miles.

LAKES AND IMPOUNDMENTS

One major artificial impoundment is located on the Iowa River. Coralville Dam and Reservoir is located north of Iowa City in Johnson County. Built as a major flood control project, the reservoir has a storage capacity of 489,000 acre-feet and regulates flow from an upstream drainage area of 3,115 square miles. The reservoir provides a conservation pool of 4,800 acres surface area for recreational purposes.

TABLE III-1

DRAINAGE AREAS OF STREAMS IN THE IOWA-CEDAR RIVER BASIN

Stream	Area (Square Miles)
West Fork Iowa River Basin	
West Fork Iowa River	149
East Fork Iowa River Basin	
East Fork Iowa River	198
Iowa River Basin	
South Fork Iowa River	309
Honey Creek	110
Iowa River USGS Gage 4515 (Marshalltown)	1,564
Linn Creek	67
Timber Creek	124
Salt Creek	223
Big Bear Creek	222
Clear Creek	105
Iowa River at USGS Gage 4545 (Iowa City)	3,271
Old Man's Creek	248
Long Creek	154
Iowa River at Mouth	12,637
English River Basin	
North English River	314
South English River	128
South English River	638
Cedar River Basin	
Little Cedar River	323
Cedar River below confluence w/Little Cedar	1,436
Cedar River below confluence w/West Fork	4,315
Beaver Creek	391
Black Hawk Creek	344
Wolf Creek	328

TABLE III-1 (Cont.)

Spring Creek	61
Lime Creek	42
Hinkle Creek	30
Cedar River at USGS Gage 4645 (Cedar Rapids)	6,510
Prairie Creek	216
Sugar Creek	222
Wapsinonoc Creek	189
Cedar River at Mouth	7,819
Shell Rock River Basin	
Winnebago River at Forest City	234
Winnebago River at Mouth	700
Shell Rock River below confluence w/Winnebago	1,229
Shell Rock River at Mouth	1,783
West Fork Cedar River Basin	
Hartgrave Creek	185
Maynes Creek	135
West Fork Cedar at Mouth (incl. Shell Rock)	2,639
Flint Creek Basin	
Flint Creek	148

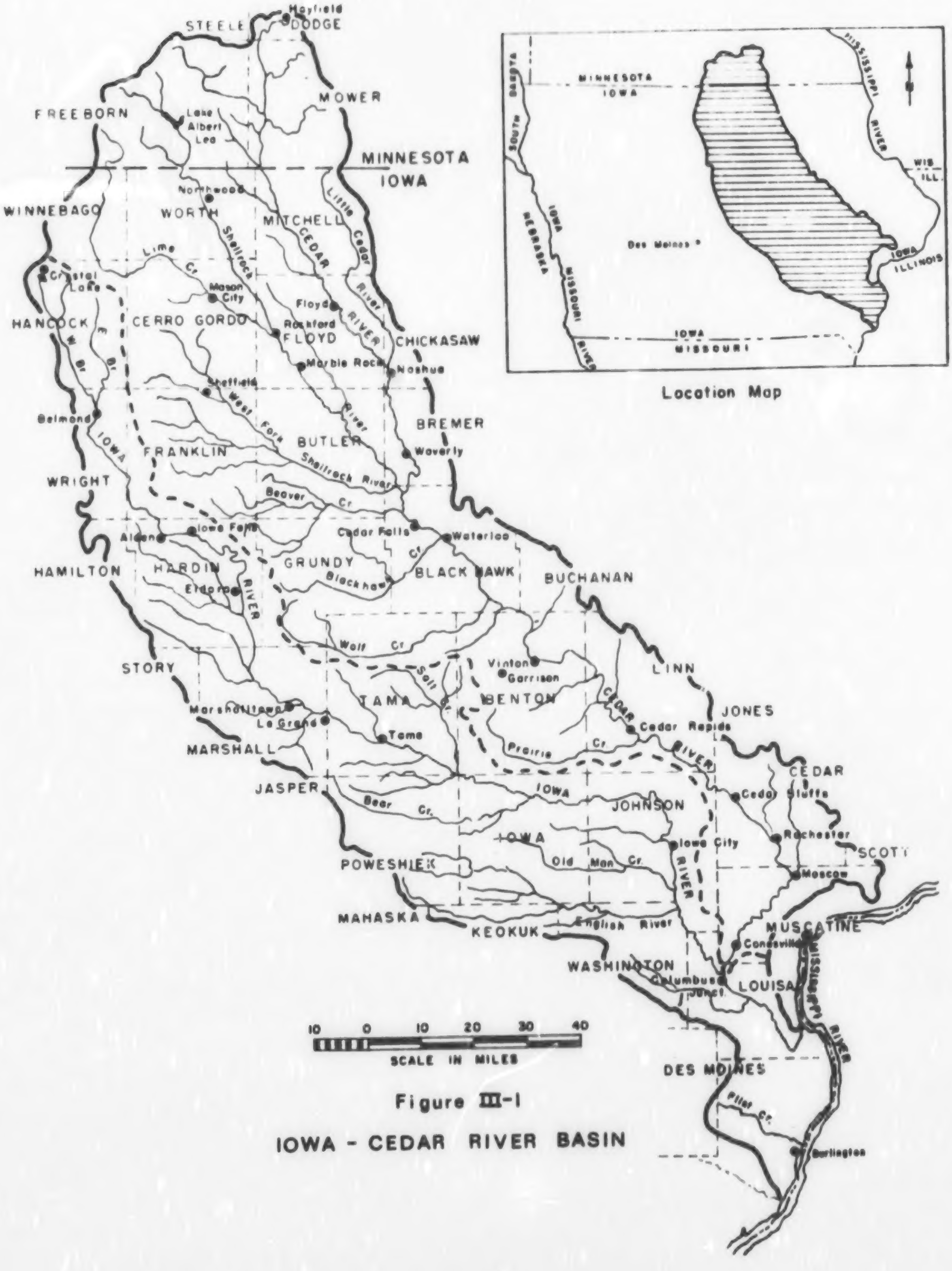

Hayfield
STEELE
DODGE
MOWER
FREEBORN
Lake Albert Lea
MINNESOTA
IOWA
Northwood
WINNEBAGO
WORTH
MITCHELL
Little Cedar River
CEDAR RIVER
Shellrock
Lime Cr
Crystal Lake
Mason City
Floyd
HANCOCK
E Br
W Br
CERRO GORDO
Rockford
FLOYD
CHICKASAW
Marble Rock
Nashua
Sheffield
West Fork
River
Belmond
IOWA
BREMER
FRANKLIN
BUTLER
Waverly
Shellrock River
WRIGHT
Beaver Cr
Cedar Falls
Waterloo
Alden
Iowa Falls
GRUNDY
Cr
HAMILTON
HARDIN
Blackhawk
BLACK HAWK
BUCHANAN
Eldora
RIVER
Wolf Cr
Vinton
STORY
Garrison
Salt
LINN
TAMA
BENTON
CEDAR
Marshalltown
JONES
Le Grand
Cedar Rapids
Tama
MARSHALL
Prairie
Cr
RIVER
CEDAR
JASPER
IOWA
Cedar Bluffs
JOHNSON
Bear Cr.
IOWA
Iowa City
Rochester
SCOTT
Old Man Cr.
POWESHIEK
RIVER
Moscow
MAHASKA
KEOKUK
English River
MUSCATINE
Conesville
WASHINGTON
Columbus Junct.
LOUISA
MISSISSIPPI RIVER
10 0 10 20 30 40
SCALE IN MILES
DES MOINES
Flint Cr.
Burlington
MINNESOTA
IOWA
SOUTH DAKOTA
MISSISSIPPI RIVER
WIS.
ILL.
IOWA
NEBRASKA
Des Moines
MISSOURI
IOWA
ILLINOIS
RIVER
IOWA
MISSOURI
Location Map

Figure III-1

IOWA - CEDAR RIVER BASIN

Two large natural lakes are also located within the basin. Clear Lake, located in Cerro Gordo County, covers 3,643 acres and Lake Odessa, located along the Mississippi River in Louisa County, has a surface area of 3,000 acres.

A total of 68 other smaller lakes and impoundments, varying in size from 1 to 950 acres of surface area, are also located in the Iowa-Cedar River Basin. Of the 71 lakes, 23 are designated in the Water Quality Standards as Classes A and B, 34 as Class B, and 2 as Classes A, B and C.

A complete listing of all lakes and impoundments in the basin, as tabulated by the State Conservation Commission, is provided in Table III-2.

PHYSIOGRAPHIC FEATURES

The basin is characterized by four topographic provinces which correspond directly to the areas of glacial drift deposits (Fig. III-2). The most recent periods of glaciation which influenced the basin physiography were substages of the Wisconsin period. Prior to the Wisconsin glacial period parts of the area were covered by the Illinoian, Kansan, and Nebraskan ice sheets. The oldest of the drifts, the Nebraskan, is deeply buried beneath the younger deposits and had little influence on the development of present topography.

TABLE III-2

IOWA-CEDAR RIVER BASIN
LAKES AND IMPOUNDMENTS

Lake or Impoundment	County	Surface Acres	Location*	Ownership	Type of Water**	Surface Water Classification A	B	C
Dudgeon Lake	Benton	45	10-85-9	State	Ox. Lk.		X	
Hannon Lake	Benton	45	11-82-32	C.C.B.	OSI	X	X	
Black Hawk Park Ponds	Black Hawk	10	14-90-1	C.C.B.	OSI		X	
Cedar Falls Impoundment	Black Hawk	30	14-90-2	Private	OnSI (Cedar R.)	X	X	
City Park Pond	Black Hawk	5	13-89-15	City	OnSI (Cedar R.)		X	
Fisher Lake	Black Hawk	8	13-89-6	State	OSI		X	
Hope Martin Pond	Black Hawk	7.5	14-90-1	City	OSI		X	
Overflow Ponds	Black Hawk	100	14-90-	Private	OSI			
Waverly Impoundment	Bremer	26	14-91-35	Private	OnSI (Cedar R.)	X	X	
Aplington Pits	Butler			C.C.B.	GP		X	
Greene Impoundment	Butler	35	17-93-1	Private	OnSI (Shell Rock R.)		X	
Lake Considine	Butler			C.C.B.	OSI		X	

TABLE III-2 (CONTINUED)

IOWA-CEDAR RIVER BASIN LAKES AND IMPOUNDMENTS

Lake or Impoundment	County	Surface Acres	Location*	Ownership	Type of Water**	Surface Water Classification A	B	C
Bennett Lake	Cedar	10	1-80-11	C.C.B.	OSI		X	
Clear Lake	Cerro Gordo	3,643	22-96-18	State	NL	X	X	X
Mason City E. Park	Cerro Gordo	1	20-96-7	City	OSI		X	
Meadow Lake	Cerro Gordo	3	20-96-14	City	OSI		X	
Rockwell Pond	Cerro Gordo	2	20-94-10	C.C.B.	OSI		X	
Rockfall Pond	Cerro Gordo	.5	19-97-22	C.C.B.	OSI		X	
Ventura Marsh	Cerro Gordo	225	22-96-21	State	NL		X	
Nashua Impoundment	Chickasaw	200	14-94-7	Private	OnSI (Cedar R.)	X	X	
Charles City Lake	Floyd	40	16-95-1	Private	OnSI (Cedar R.)		X	
Charles City Impoundment	Floyd	20	16-95-7	Private	OnSI (Cedar R.)	X	X	
Marble Rock Impoundment	Floyd	65	17-94-8	Private	OnSI (Shell Rock R.)		X	
Beeds Lake	Franklin	130	20-92-20	State	OSI	X	X	

TABLE III-2 (CONTINUED)

IOWA-CEDAR RIVER BASIN
LAKES AND IMPOUNDMENTS

Lake or Impoundment	County	Surface Acres	Location*	Ownership	Type of Water**	Surface Water Classification		
						A	B	C
Geneva Pits	Franklin	10	19-91-18	Private	GP			
Robinsons Pond	Franklin	1	20-92-23	C.C.B.	GP		X	
Pope Joy Pond	Franklin	2	22-90-21	C.C.B.	OSI		X	
Toft Pit	Franklin	5	22-91-20	C.C.B.	GP	X	X	
Rodman Park Ponds	Grundy	2	15-89-34	C.C.B.	OSI		X	
Stoehr Lake - Wellsburg	Grundy	1	18-88-15	City	OSI		X	
Crystal Lake	Hancock	261	25-97-15	State	NL	X	X	
Eagle Lake	Hancock	906	24-96-18	State	NL			
Eldred Sherwood Lake	Hancock	23	24-94-36	C.C B.	OSI	X	X	
Pilot Knob Lake	Hancock	15	23-97-3	C.C.B.	OSI	X	X	
East Twin Lake	Hancock	193	24-94-29	State	NL		X	
West Twin Lake	Hancock	109	24-94-30	State	NL		X	
Ia. R. Cl. Pond	Hardin	11	19-88-28	Private	OSI			

TABLE III-2 CONTINUED

IOWA-CEDAR RIVER BASIN
LAKES AND IMPOUNDMENTS

Lake or Impoundment	County	Surface Acres	Location*	Ownership	Type of Water**	Surface Water Classification A	Surface Water Classification B	Surface Water Classification C
Lower Pine Lake	Hardin	65	19-87-9	State	OSI	X	X	
Upper Pine Lake	Hardin	107	19-87-9	State	OSI	X	X	
Iowa Lake	Iowa	97	11-79-19	C.C.B.	OSI	X	X	
Williamsburg Pond	Iowa	3	10-79-9	City	OSI		X	
Coralville Reservoir	Johnson	4,800	6-80-22	Federal	OnSI (Iowa R.)	X	X	
Kent Park Lake	Johnson	30	8-80-24	C.C.B.	OSI		X	
Lake McBride	Johnson	950	6-81-29	State	OSI	X	X	X
South Cedar Pond	Linn	1	5-82-28	C.C.B.	Ox. Lk.		X	
Lake Odessa	Louisa	3,000	2-73-2	State	Ox. Lk.	X	X	
Mitchell Impoundment	Mitchell	140	17-98-8	C.C.B.	OnSI (Cedar R.)	X	X	
Otranto Impoundment	Mitchell	20	18-100-21	Private	OnSI (Cedar R.)		X	
St. Ansgar Impoundment	Mitchell	50	18-99-23	Private	OnSI (Cedar R.)		X	
Stacyville Impoundment	Mitchell	46	16-100-31	City	OnSI (Lt. Cedar R.)		X	

TABLE III-2 (CONTINUED)

IOWA-CEDAR RIVER BASIN LAKES AND IMPOUNDMENTS

Lake or Impoundment	County	Surface Acres	Location*	Ownership	Type of Water**	Surface Water Classification		
						A	B	C
Dakin Lake	Story	6		C.C.B.	OSI		X	
Black Hawk Lake	Tama	70	14-86-24	C.C.B.	OSI	X	X	
Cherry Lake	Tama	15	15-83-34	C.C.B.	OSI		X	
Hickory Hills Lake	Tama					X	X	
Otter Creek Lake	Tama	70	14-84-31	C.C.B.	OSI	X	X	
Union Grove Lake	Tama	126	16-85-33	State	OSI	X	X	
Foster Woods Pond	Washington	1	9-77-26	C.C.B.	OSI		X	
Iowa Township Pond	Washington	1	6-77-7	C.C.B.	OSI		X	
Marr Park Pond	Washington	1	6-75-19	C.C.B.	OSI		X	
Ambroson Pit #1	Winnebago	12	24-98-4	C.C.B.	GP			
Ambroson Pit #2	Winnebago	10	24-98-11	C.C.B.	GP			
Florence Park	Winnebago	31	25-99-26	C.C.B.	GP			
Rice Lake	Winnebago	702	23-99-13	State	NL	X	X	

TABLE III-2 (CONTINUED)

IOWA-CEDAR RIVER BASIN
LAKES AND IMPOUNDMENTS

Lake or Impoundment	County	Surface Acres	Location*	Ownership	Type of Water**	Surface Water Classification		
						A	B	C
Elk Creek Pool A	Worth		22-99-8	State	OSI			
Elk Creek Pool B	Worth		22-99-5	State	OSI			
Fertile Pond	Worth	1	22-98-34	C.C.B.	OSI			
Kensett Pit	Worth	4	20-99-19	C.C.B.	GP			
Silver Lake	Worth	330	22-100-14	State	NL	X	X	
Lake Cornelia	Wright	273	24-92-16	State	NL	X	X	
Elm Lake	Wright	463	24-92-21	State	NL			
Morse Lake	Wright	108	24-93-28	State	NL		X	

*Range-Township-Section

**Type of Water -

FP--- Farm Pond
GP--- Gravel Pit
NL--- Natural Lake
OnSI - On Stream Impoundment
OSI -- Off Stream Impoundment
Ox.Lk.-Ox Bow Lake

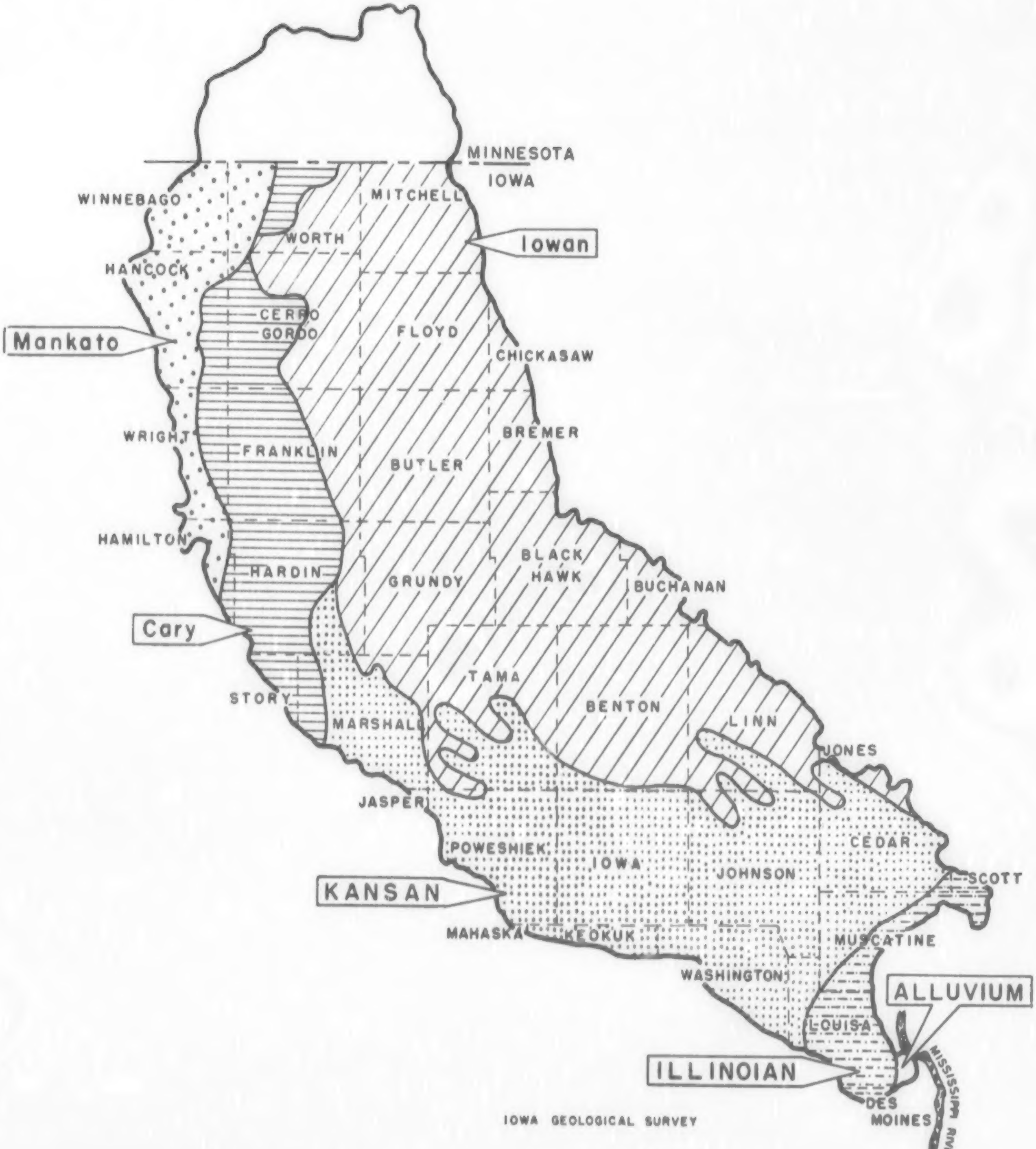

MINNESOTA
IOWA
WINNEBAGO
MITCHELL
WORTH
Iowan
HANCOCK
Mankato
CERRO GORDO
FLOYD
CHICKASAW
WRIGHT
FRANKLIN
BUTLER
BREMER
HAMILTON
BLACK HAWK
HARDIN
GRUNDY
BUCHANAN
Cary
TAMA
STORY
BENTON
LINN
MARSHALL
JONES
JASPER
CEDAR
POWESHIEK
IOWA
JOHNSON
KANSAN
SCOTT
MAHASKA
KEOKUK
MUSCATINE
WASHINGTON
ALLUVIUM
LOUISA
ILLINOIAN
DES MOINES
MISSISSIPPI RIVER
IOWA GEOLOGICAL SURVEY

FIGURE III-2 GLACIAL GEOLOGY

The youthfulness of the Wisconsin drift is indicated by the surface drainage pattern which is imperfectly developed. Much of the topography is nearly level to gently undulating with occasional depressions, lakes, ponds and sloughs. The lateral drainage system has been supplemented with artificial channels, but serious ponding still may occur after periods of heavy rainfall. The eastern boundary of the late Wisconsin drift plain through Worth, Cerro Gordo, Franklin, Hardin, and Marshall Counties is marked by moraines which are characterized by large hills and ridges, lakes and wide valleys.

The area covered by the Iowan drift has a topography that is quite different from that formed on the later Wisconsin drift. The Iowan drift is not as thick, and so the old erosional surface of the Kansas drift plain, upon which the present topography has developed, was only slightly modified by the thin veneer of material deposited. The valleys are generally broad, but flood plains are relatively narrow along most stream reaches. In many places the slopes of these broad sags merge almost imperceptibly into the adjacent uplands. The drift contains many large boulders and rock fragments, and gravel is occasionally mixed with the clayey subsoil. Lime has been leached out of the drift to a considerable depth, and drainage is adequate in most areas, indicating the greater age of the deposits.

Most of the lower Iowa-Cedar River Basin is in the area of Kansan drift. The Kansan drift plain has been deeply dissected along the major drainageways, but much of the original surface is preserved on the broad, flat divides. Natural drainage is well developed throughout the Kansan area. The table-like divides are drained by broad, shallow valleys which, as they approach the major streams, deepen into steep-walled, gorge-like ravines. In their lower reaches the streams have developed rather extensive flood plains and follow winding routes through them. Along the southern boundary of the Iowan drift the erosional topography of the Kansan is considerably modified by dune-like accumulation of wind-blown material, or loess, usually found on the eastern slopes of the hills.

The Illinoian glacier pushed only a few miles into southeastern Iowa but left a thick layer of drift. Subsequently this drift has been dissected by the major streams and their tributaries which cross the area, and most parts are well drained. Thick mantles of loess were also deposited on large areas of the uplands. The older Illinoian drift is therefore somewhat similar in topography to the neighboring Kansan.

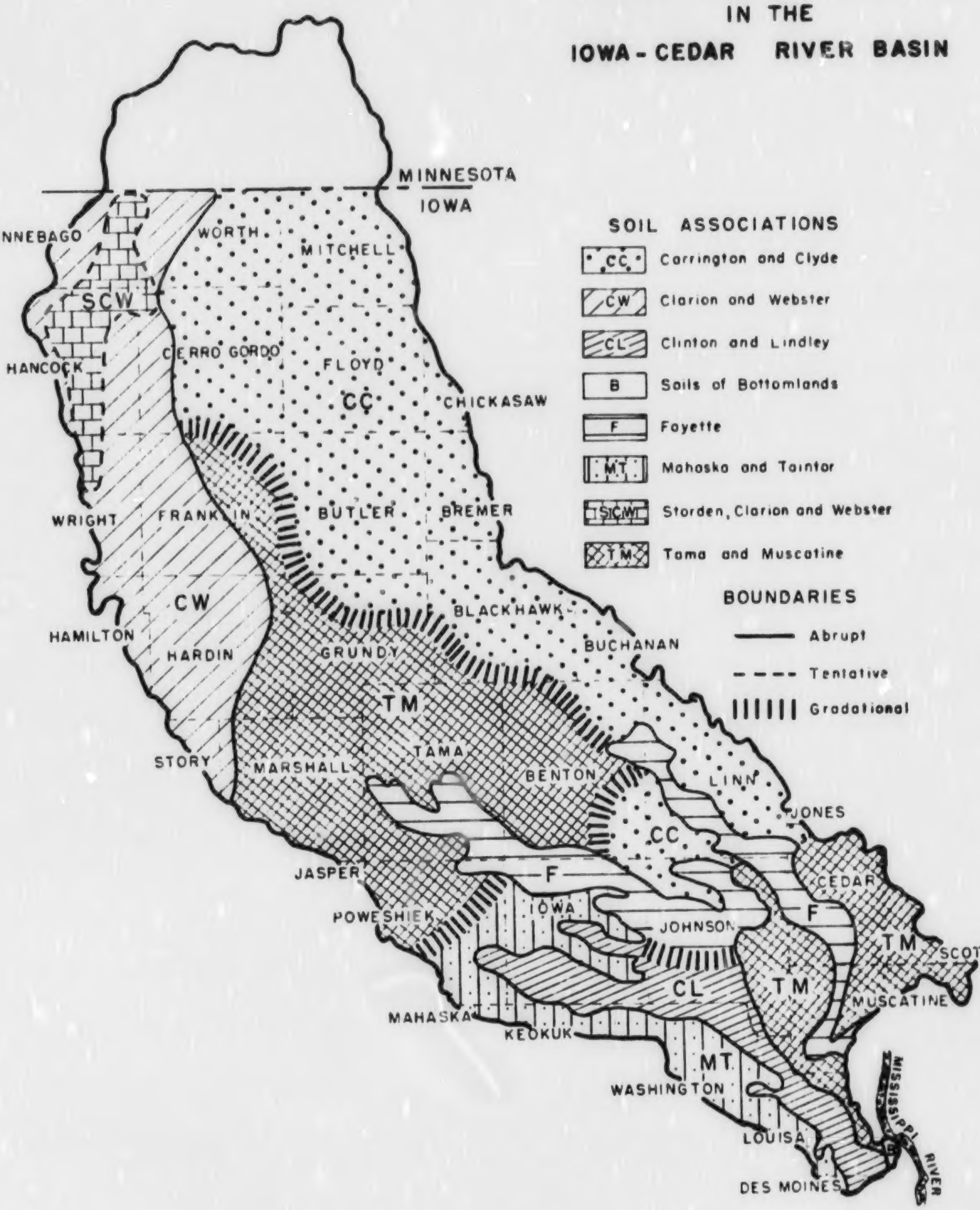
When the Illinoian ice sheet reached its maximum limit in Iowa, drainage of the area was temporarily disrupted causing the formation of a large lake which extended from the present site of Iowa City south into Louisa County and northward along the Cedar River to the vicinity of Moscow in Muscatine County. This ancient lake has been called Lake Calvin. Today a broad lacustrian plain is a significant topographic feature along the lower Iowa and Cedar Rivers in Johnson, Washington, Louisa and Muscatine Counties.

The soil types of the Iowa-Cedar River Basin may be generally grouped according to parent material into glacial drift soils, loess soils, and alluvial soils. The soils may also be grouped into soil associations which indicate areas within which a repeating pattern of soil types is found. The principal soil association areas within the basin are shown in Figure III-3, and each will be described briefly.

Soils of the Late Wisconsin Drift - The Clarion-Webster and Storden-Clarion-Webster soil associations, located in the headwaters of the Iowa River and the northwestern portion of the Cedar River Basin, are found on drift material deposited during the last substages of the Wisconsin ice advance. This area is in a youthful stage of development, and the land surface has undergone only minor alteration by erosion since retreat of the glaciers. Natural

FIGURE III - 3

MAJOR SOIL GROUPS(1) IN THE IOWA-CEDAR RIVER BASIN


MINNESOTA
IOWA
WINNEBAGO
WORTH
MITCHELL
SCW
HANCOCK
CERRO GORDO
FLOYD
CC
CHICKASAW
WRIGHT
FRANKLIN
BUTLER
BREMER
CW
HAMILTON
HARDIN
GRUNDY
BLACKHAWK
BUCHANAN
TM
STORY
MARSHALL
TAMA
BENTON
LINN
JONES
CC
JASPER
F
CEDAR
POWESHIEK
IOWA
JOHNSON
F
TM
SCOTT
CL
TM
MUSCATINE
MAHASKA
KEOKUK
MT
WASHINGTON
LOUISA
B
DES MOINES
MISSISSIPPI RIVER
SOIL ASSOCIATIONS
CC Carrington and Clyde
CW Clarion and Webster
CL Clinton and Lindley
B Soils of Bottomlands
F Fayette
MT Mahaska and Taintor
SCW Storden, Clarion and Webster
TM Tama and Muscatine
BOUNDARIES
Abrupt
Tentative
Gradational

drainage is poor in much of the area, and deposits of peat and muck are found in major depressional areas. With proper drainage the soils of the late Wisconsin drift area are some of the most productive in Iowa. Natural fertility is good, and the mineral and organic matter content is high.

Soils of the Iowan Drift Area - The soils of the Carrington-Clyde association, located in the northern part of the Cedar River Basin, are formed from drift material deposited during the Wisconsin glaciation. Because of their greater age the soils have generally been leached of calcareous material to a depth of 36 inches or more. Most of these soils were formed on topography ranging from nearly level to rolling. Although areas of poor drainage exist, ponding is not frequent, and drainage is generally better developed than it is on the Wisconsin drift. Erosion may be a problem on the steeper slopes, but with proper management the soils of this association are excellent for agriculture.

Soils of the Loess Area - In the central and southern part of the basin the outer margin of the Iowan drift and most of the Kansan and Illinoian drifts are covered with a blanket of wind-deposited loess. This has given rise to four soil associations: Tama-Muscatine, Mahaska-Taintor, Fayette, and Clinton-Lindley. The loess found in this area is different from that in western Iowa in that the deposits are not as deep, and they are finer-particled and have much lower infiltration rates. Drainage is not a serious problem in the loess area, but erosion control measures are needed on the more rolling topography.

Soils of the Bottomlands and Terraces - Terrace and bottomland soils occupy about 13 percent of the total basin area and about 20 percent of the area in the southern part of the basin. The terraces live above flood stages and are remnants of old flood plains which formed when the streams were flowing at higher levels. The bottomland soils are formed from the more recent alluvial deposits on the flood plains. Terrace soils are generally excellent for agricultural purposes although artificial drainage or irrigation may be desirable in certain areas. Flood plain soils, also, may be fertile, but because of the threat of flooding much of this land is in trees or permanent pasture. Drainage problems on the terrace and bottomland soils are severe if the subsoil is compact and impermeable. However, if the subsoil is sandy, excessive drainage may cause the soils to be droughty.

CLIMATOLOGY

A detailed discussion of the available water supply in a given area necessarily entails some discussion of the available climatologic and hydrologic data. Information of this type has been secured and is discussed in depth on a statewide basis in the Supporting Document for Iowa Water Quality Management Plans (6).

SURFACE WATERS

Stream Flow

That portion of the original precipitation which flows across the land surface and escapes into artificial and natural drainage channels is often referred to as storm runoff. It is the runoff supplemented by discharge from groundwater sources that constitutes the flow observed in streams. Obviously stream-flow is highly correlated to precipitation, which varies from year to year and from area to area. Precipitation and stream-flow also vary with time. While some years are in the normal range, others can be either wet or dry.

Although no definite cycles are apparent, runoff tends to be above, or below, average for periods longerthan one year. The longest periods when runoff was above-average were the two six-year periods 1915-20 and 1942-47. The longest below-average period was the seven years from 1953-1959. Statistics on the extremes of annual runoff at selected stations in the basin are listed in Table III-3.

The stations included in Table III-3 are predominantly those measuring the flow from drainage areas of moderate size, and those whose records included the drought of the mid-1950's. The smallest drainage areas are too sensitive to indicate hydrologic conditions; whereas large drainage areas, which integrate widespread meteorologic and physical regimes, are too insensitive to be truly representative of areal conditions.

Stream flow is characteristically variable. Knowledge of average flow alone, is insufficient for careful planning and management. In Iowa, it is common for peak flows to be 10,000 or more times the minimum flows. As an indicator of the variability of high flows, the ratio of the mean annual flood to the

TABLE III-3

ANNUAL RUNOFF AND INDICATORS OF FLOW VARIABILITY FOR SELECTED STATIONS IN THE IOWA-CEDAR RIVER BASIN (4)

		Drainage	Mean	Annual runoff in inches					Q2.33*	Q90**
Station Name	Period of Record	area sq. mi.	flow cfs.	Mean	Max.	Year	Min.	Year	Qmean	Qmean
Iowa R. nr. Rowan	1940-67	429	181	5.70	13.94	1951	.95	1956	8.0	.08
English R. at Kalona	1939-67	573	326	7.60	17.61	1960	1.14	1956	17.7	.02
W. Fk. Cedar R. at Finchford	1945-67	846	387	6.24	18.03	1951	1.05	1956	22.4	.09
Winnebago R. at Mason City	1932-67	526	220	5.70	13.12	1965	.76	1934	12.8	.08

NOTE: Minimum annual runoff for period through 1968.
* - Q2.33 is mean annual flood; Qmean is mean flow.
** - Q90 is flow equaled or exceeded 90 percent of time; Qmean is mean flow.

mean discharge for selected stations in the basin is listed in Table III-3. The mean annual flood is a fairly stable statistic which is unaffected, for the most part, by the chance occurrence of a very large flood. It is the peak flow that is equaled or exceeded once on an average of about every other year (recurrence interval, 2.33 years). The values for the ratios of the mean annual flood, for stations listed in Table III-3, varied from 8.0 to 22.4.

As an index of the variability of low flows, the ratio of the flow at the 90 percent duration level (Q90) to the mean flow is also listed in Table III-3. The variation of this ratio , from 0.02 to 0.09, is much less than that for the ratio defining high flows.

From this brief analysis, it is obvious that streamflow is highly variable. On the average, every other year a peak flow is reached that is about 15 or more times the mean flow. During 10 percent of the time, low flows are at or lower than about 8 percent of the mean flow.

The United States Geological Survey (USGS) maintains an extensive nationwide network of stream gaging stations. Stream flow is monitored continuously at some stations and periodically at others. By extrapolation of data from this established gage network and review of partial-record stations, additional flow information may be determined for streams where continuously recording stations are not provided. Not all gages in a river basin are of the same period of record; therefore, published values of statistical flows such as Q90 (the flow equaled or exceeded 90 percent of the time) or the 7-day, 1-in-10 year low flow cannot be expected to correlate exactly at different gages.

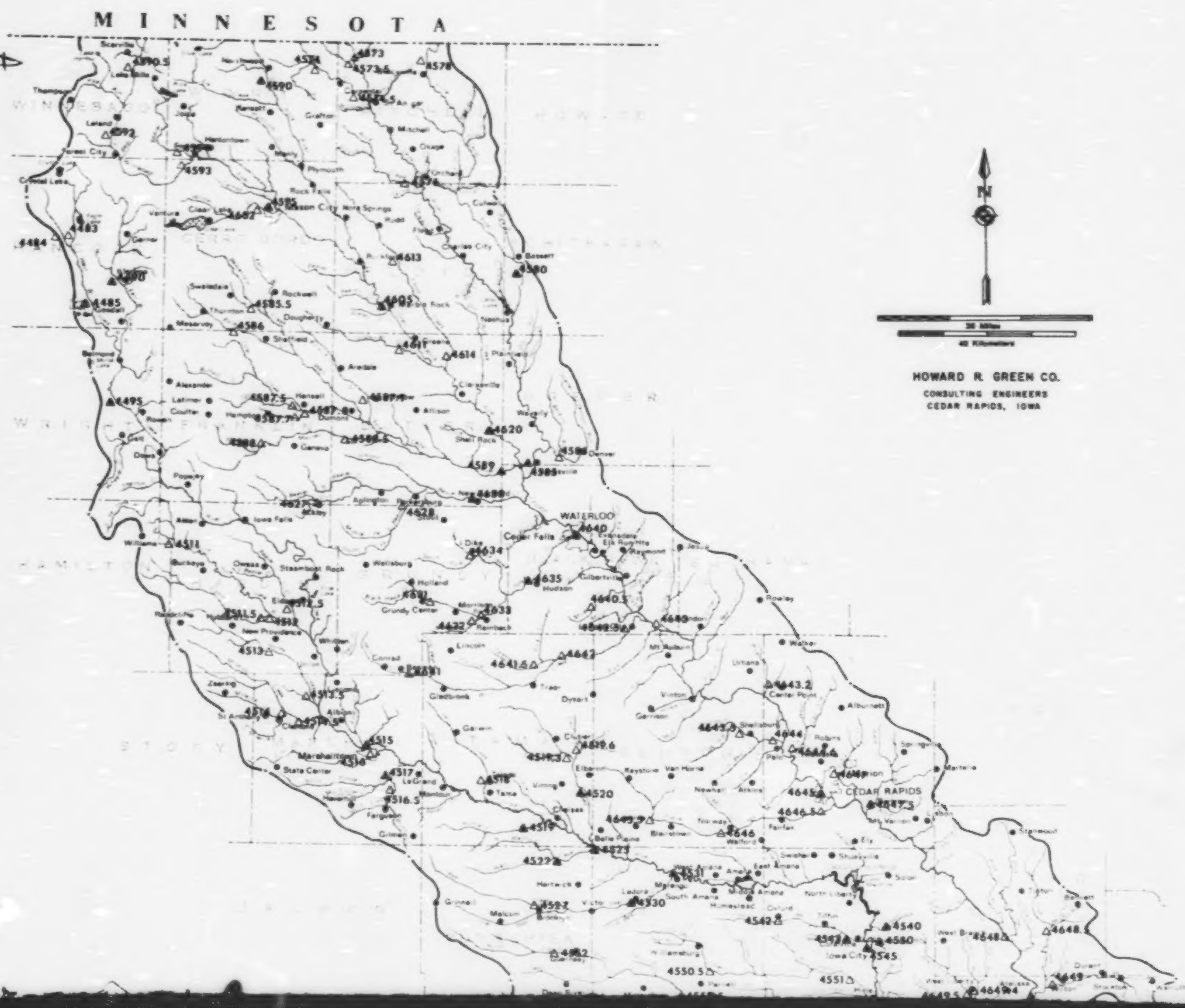
Specific USGS gaging station locations are shown on Figure III-4. Both partial-record and continuous recording gaging stations are identified. Table III-4, lists the specific station number, tributary drainage areas above the station, and the 7-day, 1-in-10 year low flow, where available, for each station.

In general, low flows in the major reaches of the Iowa-Cedar River Basin are significantly larger than the state average when results are reduced to the common basis of discharge per square mile. However, the low flows per square mile in the upper reaches and major tributaries do generally approximate the state averages, as can be seen in Table III-5.

Low flow in the Iowa River below Coralville Dam has been regulated since the reservoir was constructed in the late 1950's. The Corps of Engineers' operating procedure calls for a minimum sustained discharge of 150 cfs to be maintained at Iowa City.

Table III-5 shows a comparison of averages from long-term continuously recording gaging stations within the basin to the average for 84 stations within the State of Iowa.

A


MINNESOTA
N
20 Miles
40 Kilometers
HOWARD R. GREEN CO.
CONSULTING ENGINEERS
CEDAR RAPIDS, IOWA
WINNEBAGO
HOWARD
CERRO GORDO
CHICKASAW
WRIGHT
FRANKLIN
BUTLER
BREMER
HAMILTON
GRUNDY
BLACK HAWK
BUCHANAN
STORY
MARSHALL
TAMA
BENTON
LINN
POWESHIEK
IOWA
JOHNSON
Mason City
Clear Lake
Charles City
Waverly
Cedar Falls
WATERLOO
Marshalltown
Grundy Center
Vinton
CEDAR RAPIDS
Iowa City
Belle Plaine
Tama
Toledo
Grinnell
Shell Rock
Iowa Falls
Eldora
Hudson
Reinbeck
La Porte City
Mt Vernon
Marion
North Liberty
West Branch
Amana
Osage
Nashua
Waterloo
4640
4620
4635
4634
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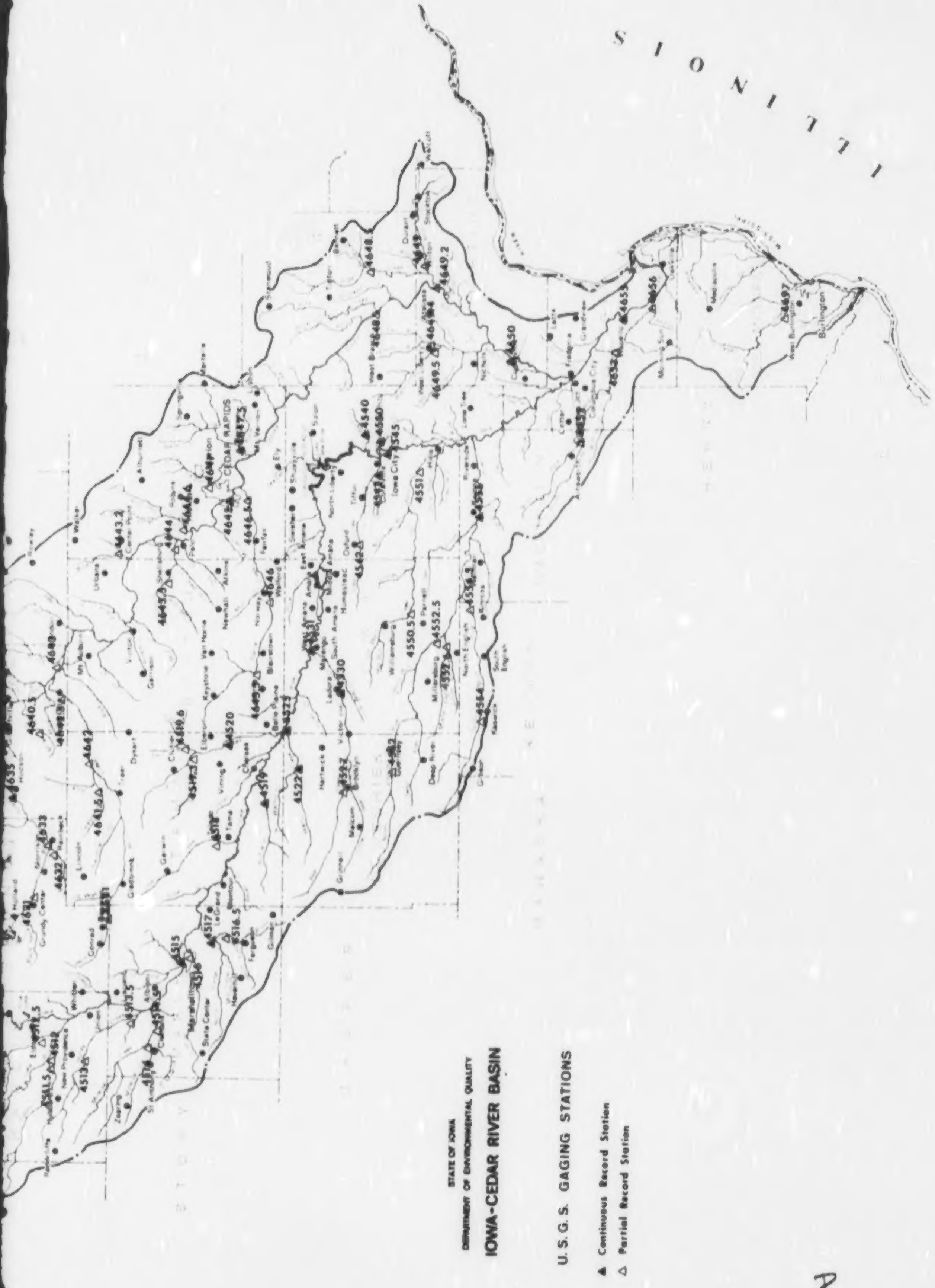
STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN
U.S.G.S. GAGING STATIONS
▲ Continuous Record Station
△ Partial Record Station
ILLINOIS
CEDAR RAPIDS
Iowa City
Marshalltown
Burlington
West Burlington

B

FIGURE III-4

TABLE III-4

U.S.G.S. GAGING STATION INFORMATION (5)

Station No.	Stream	Location	Drainage Area(Mi^2)	7Q10 (cfs)	7Q10 (cfs/mi^2)
4483	WB Iowa R.	Near Britt	61.5	0.8	.0130
4484	Westmain Drainage Ditch 1 & 2	Near Britt	21.2	0.5	.0236
4485	WB Iowa R.	Near Klemme	112	0.2	.0019
4490	EB Iowa R.	Near Klemme	133	0.76	.0057
4495	Iowa River	Near Rowan	429	4.6	.0107
4511	SF Iowa R.	Near Alden	79.5	--	--
4511.5	Tipton Cr.	Near New Providence	81.4	--	--
4512	SF Iowa R.	Near New Providence	223	--	--
4512.5	Beaver Cr.	Near Eldora	69.4	--	--
4513	Honey Cr.	Near New Providence	66.5	<0.1	<.0015
4513.5	Honey Cr.	At Bangor	95.6	--	--
4514	Minerva Cr.	At Clemons	69.6	<0.1	<.0014
4514.5	Minerva Cr.	Near Clemons	148	< 0.1	<.0007
4515	Iowa River	At Marshalltown	1,564	22	.0141
4516	Linn Cr.	At Marshalltown	60.5	--	--
4516.5	S. Timber Cr.	Near LeGrand	62.0	--	--
4517	Timber Cr.	Near Marshalltown	118	.13	.0011
4518	Deer Cr.	At Toledo	76.4	--	--
4519	Richland Cr.	Near Haven	56.1	--	--
4519.3	Salt Cr.	Near Clutier	85.2	--	--
4519.6	EB Salt Cr.	Near Elberon	71.3	--	--
4520	Salt Cr.	Near Elberon	201	2.8	.0139
4522	Walnut Cr.	Near Hartwick	70.9	--	--
4525	Iowa River	Near Belle Plaine	2,455	41	.0167
4527	Bear Cr.	At Brooklyn	77.9	--	--
4530	Big Bear Cr.	Ladora	189	0.16	.0008
4531	Iowa River	At Marengo	2,794	55	.0197

TABLE III-4 (continued)

U.S.G.S. GAGING STATION INFORMATION (5)

Station No.	Stream	Location	Drainage Area(Mi^2)	7Q10 (cfs)	7Q10 (cfs/mi^2)
4540	Rapid Cr.	Near Iowa City	25.3	--	--
4542	Clear Cr.	Near Oxford	55.0	0	0
4543	Clear Cr.	Near Coralville	98.1	0.17	.0017
4545	Iowa River	At Iowa City	3,271	*	--
4550	Ralston Cr.	At Iowa City	3.01	0	0
4550.5	Old Mans Cr.	Near Parnell	81.2	< 0.1	<.0012
4551	Old Mans Cr.	Near Iowa City	201	--	--
4552	NF English R.	Near Guernsey	68.7	--	--
4552.5	NF English R.	Near North English	221	--	--
4552.6	MF English R.	Near North English	66.7	0	0
4554	S. English R.	Near Keswick	66.2	0	0
4554.5	SF English R.	Near Kinross	125	--	--
4555	English R.	At Kalona	573	1.8	.0031
4573	Otter Cr.	Near Otranto	60.3	--	--
4573.5	Cedar R.	At Otranto	656	--	--
4574	Deer Cr.	Near Meltonville	67.5	< 0.1	< .0015
4574.5	Deer Cr.	At St. Ansgar	97.5	--	--
4576	Rock Cr.	Near Floyd	69.7	--	--
4578	L. Cedar R.	Near Staceyville	77.3	--	--
4580	L. Cedar R.	Near Ionia	306	3.5	.0114
4584	Quarter Section Run	Near Denver	83.5	0	0
4585	Cedar R.	At Janesville	1,661	62	.0373
4585.5	Beaverdam Cr.	Near Rockwell	72.4	--	--
4586	Bailey Cr.	Near Sheffield	75.2	--	--
4587.5	Otter Cr.	Near Hansell	92.0	--	--
4587.7	Squaw Cr.	Near Hansell	24.2	--	--
4587.8	Hartgrave Cr.	Near Hansell	161	--	--

* Flow affected by Coralville Reservoir.

TABLE III-4(continued)

U.S.G.S. GAGING STATION INFORMATION (5)

Station No.	Stream	Location	Drainage Area(Mi^2)	7Q10	
				(cfs)	(cfs/mi^2)
4587.9	Boylan Cr.	Near Bristow	55.7	0	0
4588	Maynes Cr.	Near Hampton	71.0	--	--
4588.5	Maynes Cr.	Near Dumont	121	--	--
4589	W. Fk. Cedar R.	At Finchford	846	9.6	.0113
4590	Shell Rock R.	Near Northwood	300	8.2	.0273
4590.5	Lime Cr.	Near Scarville	113	--	--
4592	Winnebago R.	Near Forest City	205	--	--
4593	Winnebago R.	Near Fertile	303	--	--
4594	Beaver Cr.	Near Fertile	54.9	< 0.1	< .0018
4595	Winnebago R.	At Mason City	526	6.8	.0129
4602	Willow Cr.	At Mason City	86.0	--	--
4605	Shell Rock R.	At Marble Rock	1,318	25	.0190
4611	Cold Water Cr.	Near Greene	56.8	0	0
4613	Flood Cr.	Near Rockford	59.3	0	0
4614	Flood Cr.	Near Packard	145	0	0
4620	Shell Rock R.	At Shell Rock	1,746	57	.0326
4627	Beaver Cr.	Near Ackley	55.5	--	--
4628	S. Beaver Cr.	Near Parkersburg	114	--	--
4630	Beaver Cr.	At New Hartford	347	3.9	.0112
4631	Black Hawk Cr.	Near Grundy Center	71.0	--	--
4632	Mosquito Cr.	At Reinbeck	24.0	< 0.1	< .0042
4633	Black Hawk Cr.	At Reinbeck	135	--	--
4634	N. Black Hawk Cr.	At Dike	76.3	< 0.1	< .0013
4635	Black Hawk Cr.	At Hudson	303	3.0	.0099
4640	Cedar R.	At Waterloo	5,146	240	.0466
4640.5	Millers Cr.	Near LaPorte City	54.8	< 0.1	< .0018
4641	Wolf Cr.	Near Beaman	63.2	--	--

TABLE III-4 (continued)

U.S.G.S. GAGING STATION INFORMATION (5)

Station No.	Stream	Location	Drainage Area(Mi^2)	7Q10	
				(cfs)	(cfs/mi^2)
4641.5	Twelvemile Cr.	Near Buckingham	76.8	< 0.1	< .0013
4642	Wolf Cr.	Near Buckingham	287	--	--
4642.5	Wolf Cr.	At LaPorte City	327	--	--
4643	Spring Cr.	Near LaPorte City	57.5	--	--
4643.2	E. Blue Cr.	Near Center Point	27.1	--	--
4643.5	Opossum Cr.	At Shellsburg	55.8	--	--
4644	Opossum Cr.	Near Palo	95.9	--	--
4644.6	Otter Cr.	Near Cedar Rapids	65.1	--	--
4645	Cedar R.	At Cedar Rapids	6,510	310	.0476
4645.5	Prairie Cr.	Near Blairstown	64.2	< 0.1	< .0016
4646	Prairie Cr.	At Norway	126	--	--
4646.5	Prairie Cr.	At Cedar Rapids	208	--	--
4647	Indian Cr.	At Cedar Rapids	72.0	--	--
4647.5	Big Cr.	At Bertram	81.2	--	--
4648	Rock Cr.	At Rochester	63.4	--	--
4648.5	Sugar Cr.	Near Bennett	80.7	< 0.1	< .0012
4649	Mud Cr.	Near Wilton Junction	102	< 0.1	< .0010
4649.2	Sugar Cr.	Near Moscow	218	--	--
4649.4	EB Wapsinonoc Cr.	At West Liberty	51.7	--	--
4649.5	WB Wapsinonoc Cr.	At West Liberty	52.5	0	0
4650	Cedar R.	Near Conesville	7,785	390	.0501
4652	Long Cr.	Near Ainsworth	68.4	0	0
4653	Long Cr.	Near Wapello	146	0	0
4655	Iowa R.	At Wapello	12,499	*	--
4656	Otter Cr.	Near Wapello	64.7	2.5	.0386
4697	Flint R.	Near Burlington	107	0	0

* Flow affected by Coralville Reservoir.

TABLE III-5

LOW FLOW DATA

Location	Flows, in cfs/sq.mi., Equaled or Exceeded, for Percentage of Time Indicated in Column Headings[1]				
	50	90	95	98	99
State of Iowa Average	0.150	0.033	0.024	0.018	0.015
Iowa River-Marshalltown and above (average of 2 gages)	0.174	0.038	0.026	0.018	0.014
Iowa River-Belle Plaine to Coralville Reservoir (average of 2 gages)	0.249	0.047	0.034	0.024	0.020
English River at Kalona (USGS 5-4555)	0.145	0.012	0.007	0.004	0.004
Little Cedar River nr. Ionia (USGS 5-4580)	0.144	0.049	0.033	0.020	0.013
West Fork Cedar River at Finchford (USGS 5-4589)	0.174	0.040	0.026	0.015	0.011
Shell Rock River (average of 3 gages)	0.177	0.056	0.043	0.029	0.021
Cedar River (average of 4 gages)	0.264	0.092	0.073	0.057	0.049

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[1] Iowa Natural Resources Council, Low-Flow Characteristics of Iowa Streams Through 1966, Bulletin No. 10, 1970.

HYDROGEOLOGY

The narrow valleys of the Cedar and Iowa Rivers are underlain by glacial and alluvial deposits including highly permeable sand and gravel. Parts of the tributary valleys also contain such deposits, but their location is not known accurately. Despite the large supplies of ground water available from these sand and gravel deposits, little use has been made of this source and therefore little information is available concerning the thickness and hydraulic properties of the deposits. Many cities and towns along the Cedar and Iowa Rivers use ground water, but nearly all of them obtain their water from the underlying bedrock rather than from the shallower sand and gravel. Waterloo on the Cedar River has used 18 wells, of which at least seven are in sand and gravel and average about 85 feet in depth. The city of Cedar Rapids has a well field along the Cedar River where the river crosses a buried channel. This location is favorable for ground-water development, and the yields of 1,000 to 2,000 gpm are higher than the average for the river valley aquifer. Along the Iowa River, several small towns use water from the sand and gravel, obtained from wells 32 to 90 feet deep.

Major portions of the basin are underlain by bedrock formations that can also be depended on to yield large quantities of water. A general discussion of these formations has been provided in Reference (6).

GROUNDWATER QUALITY

Groundwater is obtained from both shallow and deep unconsolidated deposits and underlying bedrock. The unconsolidated deposits consist of sand, gravel, silt, and weathered glacial tills. The bedrock units are mostly dolomites and sandstone.

In the upland, shallow unconsolidated deposits are generally poor producers supplying low-producing private wells. In the stream valleys where they are recharged from surface streams, some shallow deposits supply large quantities of water. However, the yield reflects fluctuations in stream flow, especially during periods of drought. The deep unconsolidated deposits are also recharged directly from surface streams and precipitation. Because the recharge water must travel through thick layers of drift, these supplies often contain significant concentrations of dissolved minerals.

All the bedrock formations provide good aquifers except the Pennsylvanian, where the water is highly mineralized. Limestones in the Devonian system provide some of the best aquifers in the Basin. Other important aquifers are Niagaran dolomites of Silurian age and the St. Peter, Galena, and other formations of the Ordovician system. The Jordan Sandstone, which is usually found at about 1,500 feet, is also a very productive aquifer.

Groundwater is the major source of municipal supply. Industries also make demand on groundwater supplies. The relatively abundant groundwater resources are partly responsible for the industrial development in the basin. In some areas of heavy pumping, lowering of groundwater tables has occurred. In areas of heavy groundwater use, the practice of locating wells where recharge may be obtained from surface streams is increasing.

The mineral composition of groundwater is determined by the types of solid minerals which the water has contacted. However, this relation may become complex because of interconnected aquifers of different mineral composition. Water obtained from sand and gravel is usually hard because limestone formations were the source of much of the glacial drift. Groundwater obtained from a specific well usually has nearly constant quality. However, in heavily pumped well fields, quality may change because of induced inflow from a dissimilar aquifer or from a surface stream.

Groundwaters of the basin are generally suitable for supplemental irrigation, municipal, and industrial use. However, for the latter two uses, moderate treatment may be required, especially softening and iron removal.

A further discussion of groundwater quality within the State is contained in Reference (6).

REFERENCES

1. An Inventory of Water Resources and Water Problems, Iowa-Cedar River Basin, Iowa, prepared by the Iowa Natural Resources Council, 1955.

2. R. H. Shaw and P. J. Waite. The Climate of Iowa III Monthly, Crop Season and Animal Temperature and Precipitation Normals for Iowa, Agricultural and Home Economics Experiment Station, Iowa State University of Science and Technology, Ames, Iowa, April 1964.

3. Ivan L. Burnmeisler, The Streamflow Data Program in Iowa U. S. Department of Interior, Geological Survey, Water Resources Division, Iowa City, Iowa, 1970.

4. Water Resources of Iowa, Ed. Paul J. Horick, University Printing Service, Iowa City, Iowa, January 1970.

5. Low Flow Characteristics of Iowa Streams Through 1966, Albert J. Heinitz, prepared by the U. S Geological Survey, Water Resources Division, in cooperation with the Iowa Natural Resources Council, State of Iowa, 1970.

6. Supporting Document for Iowa Water Quality Management Plans, Iowa Department of Environmental Quality, 1976.

7. Upper Mississippi River Comprehensive Basin Study Appendices E and H, UMRCBS Coordinating Committee, 1970.

CHAPTER IV - WATER QUALITY

The main objective of water quality management is to protect and enhance the water resources to ensure acceptable conditions for designated uses. Sound management first requires knowledge of the existing water quality.

Existing water quality for the Iowa-Cedar River Basin has been identified from available data. The data indicate some areas of degraded water quality.

It is the purpose of water quality standards to limit the input of people-generated materials so that waters will be able to meet the general interests of its users.

The Iowa Water Quality Commission has classified streams into four classifications: A, B, C, and General. Class A Waters are those which are to be preserved for whole body contact. Class B Waters are those which are to be preserved for wildlife, aquatic life, and non-body contact recreation. Class C Waters are those which must be of a quality to meet requirements for use as a potable water supply. The General classification applies to all water classifications at all times and addresses parameters which are principally physical in nature such as floating material, color, and turbidity. The Supporting Document for Iowa Water Quality Management Plans lists the standards in detail for each class.

In addition to material contamination, thermal changes are important to water quality, since different life forms find different water temperatures conducive to their well-being. Changing temperatures of a stream may result in entirely different proportions of species in the stream, and may even result in the disappearance of some forms and the appearance of others. Standards have been set for thermal controls and streams have been further classified as to being "cold water" or "warm water."

Table IV-1 from the Water Quality Standards, Chapter 16, Iowa Departmental Rules, presents the classifications of the various streams in the Iowa-Cedar River Basin, and Figure IV-1 charts these classifications.

TABLE IV-1

SURFACE WATER CLASSIFICATION

IOWA-CEDAR RIVER BASIN

Stream Segment	Classification			
	A	B		C
		Fresh Warm Water	Fresh Cold Water	
A. Mississippi River - Main Stem Mo. State line to Minn. State line	X	X		X(above Keokuk Ft. Madison Burlington & Davenport)
1. Iowa River				
mouth to confl. with Cedar R.		X		
from confl. with Cedar R. to dam at Ia. City		X		
Iowa City Impoundment	X	X		X(above Iowa City)
Iowa City Impoundment to power dam at Coralville		X		
Power dam impoundment (dam to Coralville Reservoir)	X	X		
Coralville Reservoir (dam to Hwy 218)	X	X		
Coralville Reservoir to Steamboat Rock Dam		X		
Steamboat Rock Impoundment	X	X		
Steamboat Rock Impoundment to Iowa Falls Dam		X		
Iowa Falls Impoundment	X	X		
Iowa Falls Impoundment to Alden Dam		X		
Alden Impoundment	X	X		
Alden Impoundment to confl. of E. & W. Branches		X		
a. Cedar R.				
mouth to Palisades Dam		X		
Palisades Impoundment	X	X		
Palisades Impoundment to Ellis Park Dam (Cedar Rapids)		X		X(above Cedar Rapids)
Ellis Park Impoundment	X	X		
Ellis Park Impoundment to Cedar Falls Impoundment		X		
Cedar Falls Impoundment	X	X		

TABLE IV-1

SURFACE WATER CLASSIFICATION

IOWA-CEDAR RIVER BASIN
-continued-

	Classification			
	A		B	C
		Fresh Warm Water	Fresh Cold Water	
Cedar Falls Impoundment to Waverly Impoundment		X		
Waverly Impoundment	X	X		
Waverly Impoundment to Nashua Impoundment		X		
Nashua Impoundment	X	X		
Nashua Impoundment to Charles City Impoundment		X		
Charles City Impoundment	X	X		
Charles City Impoundment to Mitchell Impoundment		X		
Mitchell Impoundment	X	X		
Mitchell Impoundment to Minn. State line		X		
(1) Prairie Cr. (mouth in Linn Co.)		X		
(2) Hinkle Cr.		X		
(3) Pratt Cr.		X		
(4) Bear Cr. (mouth in Benton Co.)		X		
(5) Lime Cr. (mouth in Benton Co.)		X		
(6) Spring Cr. (mouth in Black Hawk Co.)		X		
(7) Rock Cr. (mouth in Black Hawk Co.)		X		
(8) Wolf Cr. mouth to Tama Co. Rd. T47		X		
(9) Big Slough Cr.		X		
(10) Mud Cr. (mouth in Black Hawk Co.)		X		
(11) Millers Cr.		X		
(12) Indian Cr.		X		
(13) Poyner Cr.		X		
(14) Sink Cr.		X		
(15) Black Hawk Cr. mouth to confl. with Holland Cr.		X		
(16) Dry Run Cr. (mouth in Black Hawk Co.)		X		

TABLE IV-1

SURFACE WATER CLASSIFICATION

IOWA-CEDAR RIVER BASIN
-continued-

	Classification		
	A Fresh Warm Water	B Fresh Cold Water	C
(17) Beaver Cr. (mouth in Black Hawk Co.) mouth to Butler Co. Rd. T25	X		
(a) Johnson Cr. mouth to Butler Co. Road T25	X		
(b) South Beaver Cr. mouth to Grundy Co. Road T25	X		
(18) West Fork Cedar R. mouth to confl. of Beaver Dam Cr. and Bailey Cr.	X		
(a) Shell Rock River mouth to Minn. State line	X		
-1- Dry Run Cr. (mouth in Butler Co.) mouth to Highway 188	X		
-2- Flood Cr. mouth to confl. with Little Flood Cr.	X		
-3- Coldwater Cr. mouth to Floyd Co. line	X		
-4- Winnebago R. (aka Lime Creek) mouth to Minn. State line	X		
-a- Willow Cr. (mouth in Cerro Gordo Co.) mouth to Cerro Gordo Co. Road S28	X		
[1] Clear Cr. mouth to Clear Lake Outlet	X		

TABLE IV-1

SURFACE WATER CLASSIFICATION

IOWA-CEDAR RIVER BASIN

-continued-

	Classification			
	A		B	C
		Fresh Warm Water	Fresh Cold Water	
-b- Beaver Cr. (mouth in Worth Co.) mouth to Winnebago Co. line		X		
-5- Elk Cr. mouth to Highway 105		X		
(b) Maynes Cr. mouth to Highway 65		X		
(c) Hartgrave Cr. mouth to confl. of Otter Cr. and Squaw Cr.		X		
-1- Otter Cr. (mouth in Franklin Co.) mouth to Highway 65		X		
-a- Spring Cr. (mouth in Franklin Co.) mouth to Beeds Lake Impoundment		X		
Beeds Lake Impoundment	X	X		
(d) Beaver Dam Cr. mouth to Cerro Gordo Co. line		X		
(19) Quarter Section Run		X		
(a) Baskins Run		X		
(20) Dry Run (aka Two Mile Cr.) (mouth in Bremer Co.) mouth to Chickasaw Co. line		X		
(a) Horton Cr. mouth to Chickasaw Co. line		X		
(21) Little Cedar River mouth to Minn. State line		X		

TABLE IV-1

SURFACE WATER CLASSIFICATION

IOWA-CEDAR RIVER BASIN

-continued-

		Classification		
		A Fresh Warm Water	B Fresh Cold Water	C
(a)	Beaver Cr. (mouth in Chickasaw Co.) mouth to Floyd Co. line	X		
(b)	Slough Cr. mouth to Mitchell Co. line	X		
(c)	Uphams Slough Cr. mouth to Floyd Co. Rd. T64	X		
(d)	Fish Cr.	X		
(e)	Soap Cr. mouth to Highway 9	X		
(f)	Burr Oak Cr. mouth to Mitchell Co. Road T42	X		
(g)	Beaver Cr. (mouth in Mitchell Co.) mouth to Mitchell Co. Road A31	X		
(22)	Gizzard Cr. mouth to Floyd Co. Road B59	X		
(23)	Bloody Run	X		
(24)	Stewart Cr. mouth to Floyd Co. Road T38	X		
(25)	Skunk Cr. mouth to Floyd Co. Road T34	X		
(26)	Rock Cr. (mouth in Floyd Co.) mouth to Mitchell Co. Road S70	X		
(a)	Goose Cr. mouth to Mitchell Co. Road S70	X		
(27)	Spring Cr. (mouth in Mitchell Co.) mouth to Mitchell Co. Road A57		X	
(28)	Willow Cr. (mouth in Mitchell Co.) mouth to Mitchell Co. Rd. S70	X		

TABLE IV-1

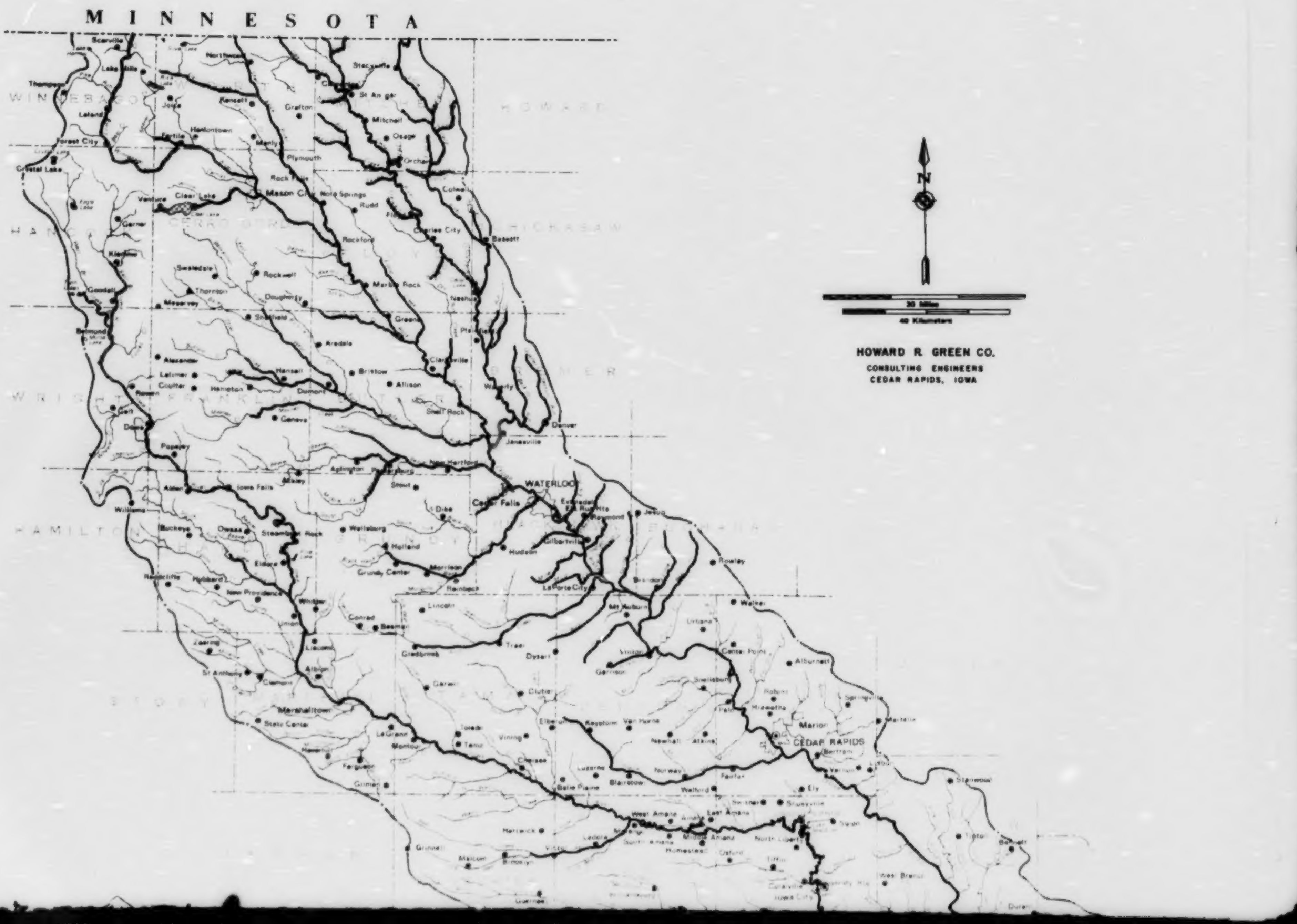
SURFACE WATER CLASSIFICATION

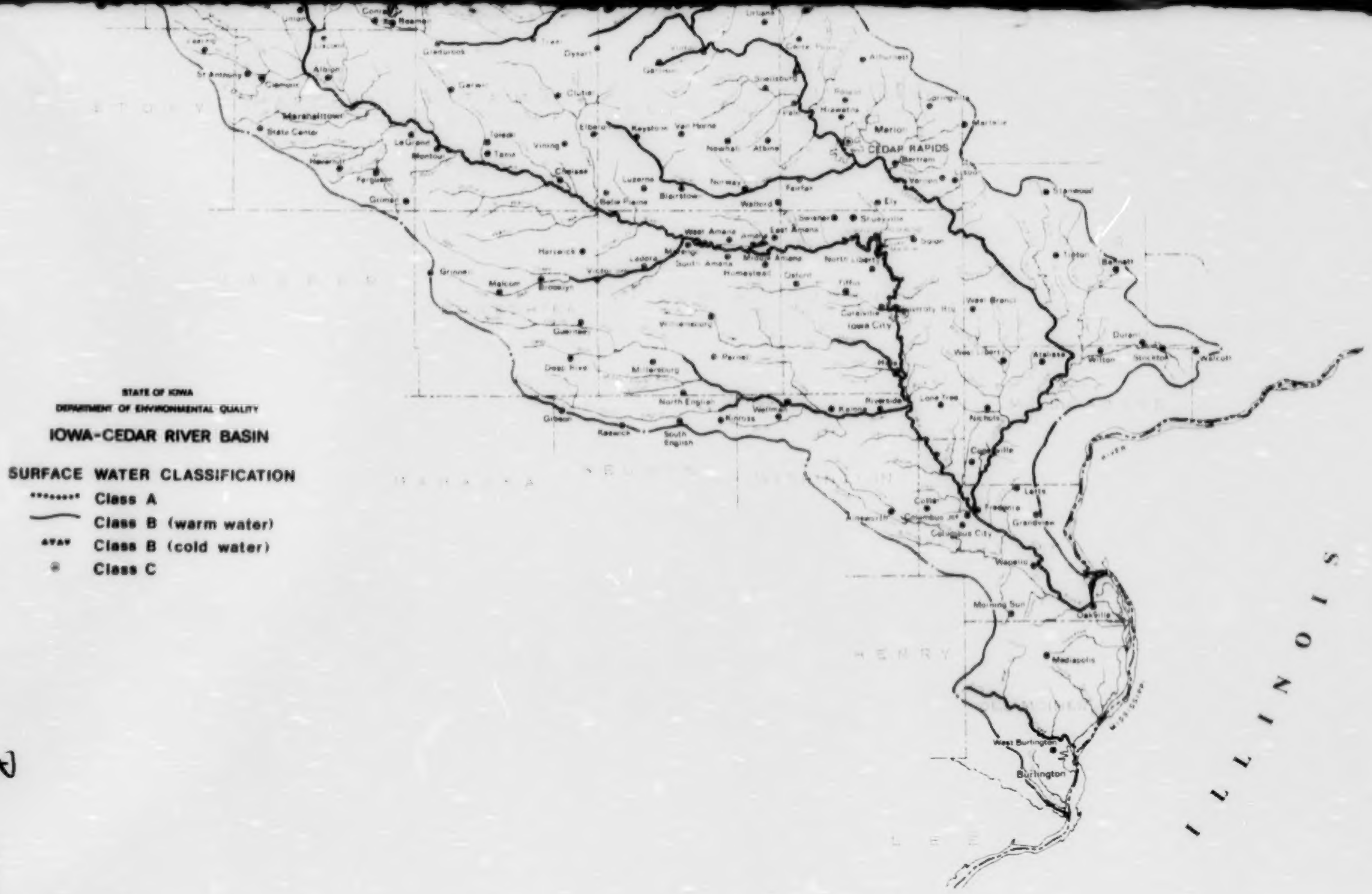
IOWA-CEDAR RIVER BASIN

-continued-

	Classification		
	A Fresh Warm Water	B Fresh Cold Water	C
(29) Turtle Cr. mouth to Mitchell Co. Road T28		X	
(30) Deer Cr. (mouth in Mitchell Co.) mouth to Minn. State line	X		
(31) Otter Cr. (mouth in Mitchell Co.) mouth to Minn. State line	X		
b. English R. mouth to confl. of N. & S. Fork English R.	X		
(1) N. Fork English R. mouth to Highway 149	X		
(2) S. Fork English R. mouth to County Road north of Kinross	X		
c. Old Mans Cr. mouth to confl. with N. Branch Old Mans Cr.	X		
d. Bear Cr. (mouth in Iowa Co.) mouth to Highway 21	X		
e. S. Fork Iowa R. mouth to Highway 65	X		
f. E. Branch Iowa R. mouth to Hancock Co. Road B55	X		
g. W. Branch Iowa R. mouth to Hancock Co. Road B62	X		
2. Flint Cr. (aka Flint R. in Des Moines Co.) mouth to Henry Co. line	X		

A


MINNESOTA
N
30 Miles
40 Kilometers
HOWARD R. GREEN CO.
CONSULTING ENGINEERS
CEDAR RAPIDS, IOWA
WINNEBAGO
WORTH
MITCHELL
HOWARD
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
WRIGHT
FRANKLIN
BUTLER
BREMER
HAMILTON
HARDIN
GRUNDY
BLACK HAWK
BUCHANAN
STORY
MARSHALL
TAMA
BENTON
LINN
Scarville
Thompson
Lake Mills
Northwood
Stacyville
St Ansgar
Grafton
Kensett
Joice
Leland
Forest City
Hanlontown
Fertile
Manly
Mitchell
Osage
Orchard
Crystal Lake
Plymouth
Rock Falls
Mason City
Nora Springs
Rudd
Colwell
Ventura
Clear Lake
Garner
Charles City
Bassett
Rockford
Klemme
Swaledale
Rockwell
Thornton
Marble Rock
Goodell
Dougherty
Nashua
Meservey
Sheffield
Greene
Plainfield
Belmond
Aredale
Clarksville
Alexander
Hansell
Bristow
Allison
Latimer
Coulter
Hampton
Dumont
Waverly
Rowan
Shell Rock
Galt
Geneva
Denver
Dows
Janesville
Popejoy
Arlington
Parkersburg
New Hartford
WATERLOO
Alden
Iowa Falls
Stout
Cedar Falls
Evansdale
Elk Run Hts
Williams
Dike
Raymond
Jesup
Buckeye
Owasa
Steamboat Rock
Wellsburg
Gilbertville
Holland
Hudson
Rowley
Eldora
Morrison
Grundy Center
Reinbeck
La Porte City
Brandon
Radcliffe
Hubbard
New Providence
Whitten
Lincoln
Mt Auburn
Walker
Union
Conrad
Beaman
Urbana
Zearing
Liscomb
Gladbrook
Traer
Dysart
Vinton
Center Point
Alburnett
St Anthony
Clemons
Albion
Garrison
Shellsburg
Garwin
Clutier
Robins
Springville
Marshalltown
Palo
Hiawatha
Marion
State Center
Elberon
Keystone
Van Horne
Newhall
Atkins
CEDAR RAPIDS
LeGrand
Toledo
Vining
Montour
Tama
Bertram
Haverhill
Chelsea
Luzerne
Norway
Fairfax
Mount Vernon
Lisbon
Ferguson
Belle Plaine
Blairstown
Walford
Ely
Stanwood
Gilman
Swisher
Shueyville
West Amana
Amana
East Amana
Solon
Hartwick
Marengo
South Amana
Middle Amana
North Liberty
Tipton
Bennett
Ladora
Homestead
Oxford
Tiffin
Grinnell
Malcom
Brooklyn
Victor
Coralville
Iowa City
West Branch
Montezuma
Guernsey
Durant


STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN
SURFACE WATER CLASSIFICATION
Class A
Class B (warm water)
Class B (cold water)
Class C
ILLINOIS
HENRY
LEE
CEDAR RAPIDS
Iowa City
Marion
Marshalltown
State Center
Albion
Le Grand
Montour
Toledo
Tama
Chelsea
Belle Plaine
Luzerne
Blairstown
Keystone
Van Horne
Newhall
Atkins
Norway
Walford
Fairfax
Ely
Swisher
Shueyville
Solon
West Amana
Amana
East Amana
Middle Amana
South Amana
Homestead
Marengo
Ladora
Victor
Brooklyn
Malcom
Grinnell
Hartwick
Guernsey
Deep River
Millersburg
Williamsburg
Parnell
North English
South English
Wellman
Kalona
Riverside
Kinross
Keswick
Gibson
North Liberty
Tiffin
Oxford
Coralville
University Hts
West Branch
West Liberty
Atalissa
Tipton
Bennett
Stanwood
Durant
Wilton
Stockton
Walcott
Lone Tree
Nichols
Conesville
Letts
Fredonia
Grandview
Columbus Jct
Columbus City
Wapello
Morning Sun
Oakville
Mediapolis
West Burlington
Burlington
Hiawatha
Robins
Springville
Martelle
Bertram
Vernon
Mt Vernon
Lisbon
Elberon
Vining
Clutier
Garwin
Dysart
Gladbrook
St Anthony
Clemons
Haverhill
Ferguson
Gilman
Albion
Garrison
Shellsburg
Palo
Center Point
Alburnett
Urbana
Fairfax
MISSISSIPPI RIVER

B

FIGURE IV-1

The U. S. Environmental Protection Agency (EPA) has prepared a set of proposed criteria for water quality that differ in some instances from Iowa's standards. These are also presented in the Supporting Document. It is likely that Iowa's standards and EPA standards will become very nearly identical. Although the present standards may be different, their purposes are the same--to manage water quality to meet the best interest of all users.

DATA COLLECTION

The evaluation of water quality in the Iowa-Cedar River Basin is based upon data collected by the DEQ, the State Health Department, the State Hygienic Laboratory, and Iowa State University. Some additional data are available from other State, local and Federal agencies.

IOWA RIVER

The most significant pollution problems on the Iowa River are low dissolved oxygen and high turbidity, primarily the result of high organic loadings from nearby municipal and industrial sources. Dissolved oxygen levels have often been found in violation of Iowa stream standards. Turbidity problems are even more unique in that the Iowa River has the worst turbidity of any eastern Iowa river.

Water Quality Conditions

Harmful Substances - Heavy metals found in the Iowa River have included barium, copper, lead, manganese, zinc, and selenium. Only copper has been found in violation of Iowa standards.

Pesticides found in the Iowa River include DDE, DDT, dieldrin, and atrazine. DDE, DDT, and dieldrin have been found in concentrations which exceed recommended maximum levels established by the National Academy of Science. Studies conducted at Coralville Reservoir indicate that these pesticides, coming from agricultural runoff, are concentrated in algae and fish in the reservoir. Concentrations many times higher than in the river have been found in algae and fish at Coralville.

Physical Modification - Turbidity and suspended solids cause several problems in the Iowa River. They are unusually high for this part of the State. Suspended sediment concentrations found in the Iowa River have ranged from 9 to 4,700 mg/l in recent years.

TABLE IV-2

HEAVY METALS IN THE IOWA RIVER BELOW CORALVILLE

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (μg/l)	MAXIMUM (μg/l)
As	18	0		
Ba	19	19	174	400
Cd	21	0		
Cr	23	0		
Cu	21	4	50	130
Pb	21	3	40	60
Mn	23	22	139	1600
Hg	9	0		
Ni	18	0		
Ag	14	0		
Zn	21	14	101	300
Se	1	1	1	1

TABLE IV-3

HEAVY METALS IN THE IOWA RIVER ABOVE MARSHALLTOWN

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (μg/l)	MAXIMUM (μg/l)
As	4	0		
Ba	6	6	180	300
Cd	6	0		
Cr	10	0		
Cu	6	0		
Pb	6	0		
Mn	5	5	328	580
Hg	5	0		
Ni	2	0		
Ag	0	0		
Zn	6	3	110	160

TABLE IV-4

HEAVY METALS IN THE IOWA RIVER - MARSHALLTOWN TO CORALVILLE

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (μg/l)	MAXIMUM (μg/l)
As	5	0		
Ba	15	13	252	900
Cd	17	0		
Cr	17	0		
Cu	17	0		
Pb	17	3	30	50
Mn	7	6	90	380
Hg	3	0		
Ni	17	0		
Ag	5	0		
Zn	17	11	53	90
Se	1	1	1	1

TABLE IV-5

PESTICIDES IN THE IOWA RIVER

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (ng/l)	MAXIMUM (ng/l)
Aldrin	1			
DDE	21	3	119	350
DDT	16	1	12	12
Dieldrin	22	19	10	16
Atrazine	2	2	1600	3000

Temperature effects from possible stratification of Coralville Reservoir and from cooling water discharges may create problems. The wide fluctuations in water level at Coralville have not allowed stratification to develop to the point that it does in some reservoirs. For this reason the temperature changes from discharges would be less severe. The impact of cooling water discharges on temperature in the Iowa River is not known.

Eutrophication Potential - Nitrates and phosphates are both abundant in the Iowa River. Phosphate data for the 1970's indicate a general decrease in total phosphate from the Iowa Falls area to the mouth. Higher concentrations are also found below other point sources, particularly Marshalltown. Point sources appear to add significant concentrations of phosphates all along the river. At high flows additional nutrients run off the predominantly agricultural land in the basin. Concentrations of nutrients in Coralville Reservoir appear to be predominantly from nonpoint sources (McDonald, 1972). Large algal populations, including significant blue-green algal blooms, have occurred in Coralville Reservoir due to the abundance of nutrients. The reservoir has the effect of lowering nutrient levels below the dam (Figure IV-2).

Salinity, Acidity, and Alkalinity - Total dissolved solids concentrations in the Iowa River have averaged 271 mg/1 in samples collected since 1970. Maximum concentrations have

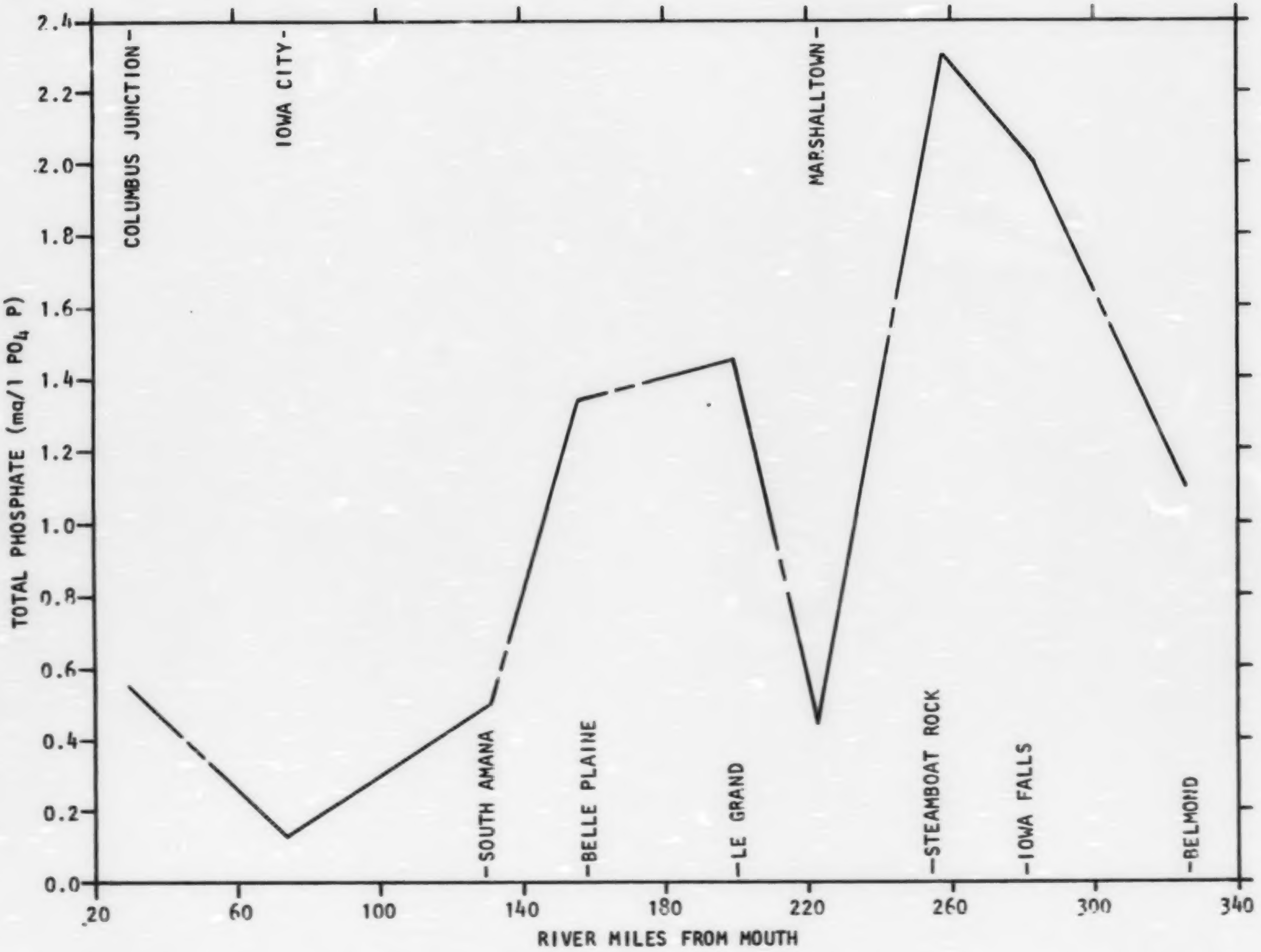


FIGURE IV-2 MEAN TOTAL PHOSPHATE CONCENTRATIONS IN THE IOWA RIVER

exceeded Iowa stream standards and have reached 782 mg/l. Alkalinity has ranged from 81 mg/l to 364 mg/l, with an average of 212 mg/l. Hardness ranged from 92 mg/l to 428 mg/l and averaged 252 mg/l.

Health Hazards and Aesthetic Degradation - Total and fecal coliform concentrations vary widely in the Iowa River. Concentrations from point sources cause higher levels below most municipalities. Nonpoint sources cause large increases in fecal and total coliform concentrations during runoff periods. Coralville Reservoir has a tendency to decrease coliform counts below the reservoir and generally improve water quality. Highest coliform concentrations have been found below Marshalltown, Iowa Falls, and Belle Plaine (Figure IV-9).

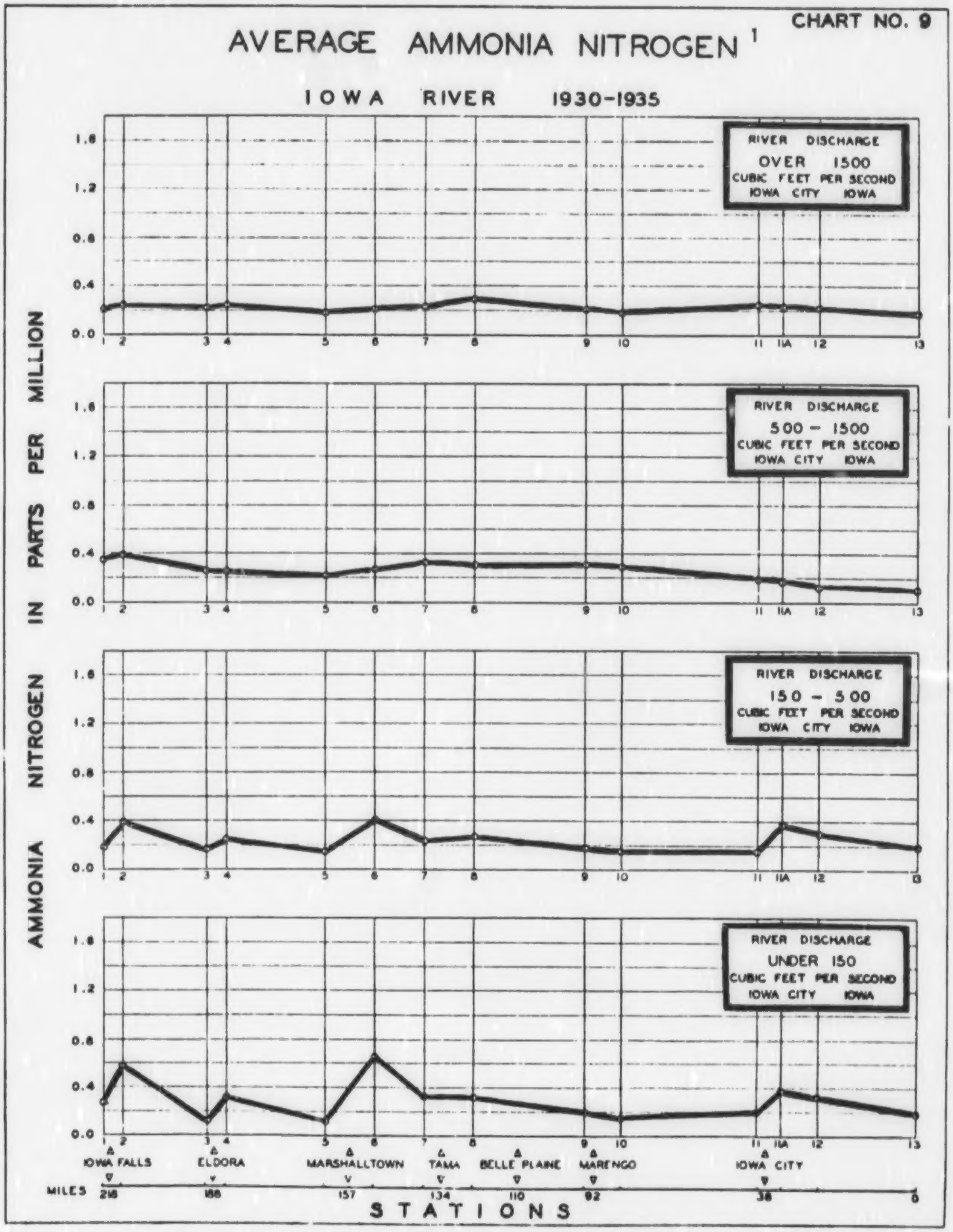


FIGURE IV-3 [1]AVERAGE AMMONIA NITROGEN-IOWA RIVER, 1930-1935 (STATE DEPARTMENT OF HEALTH, JUNE 1935)

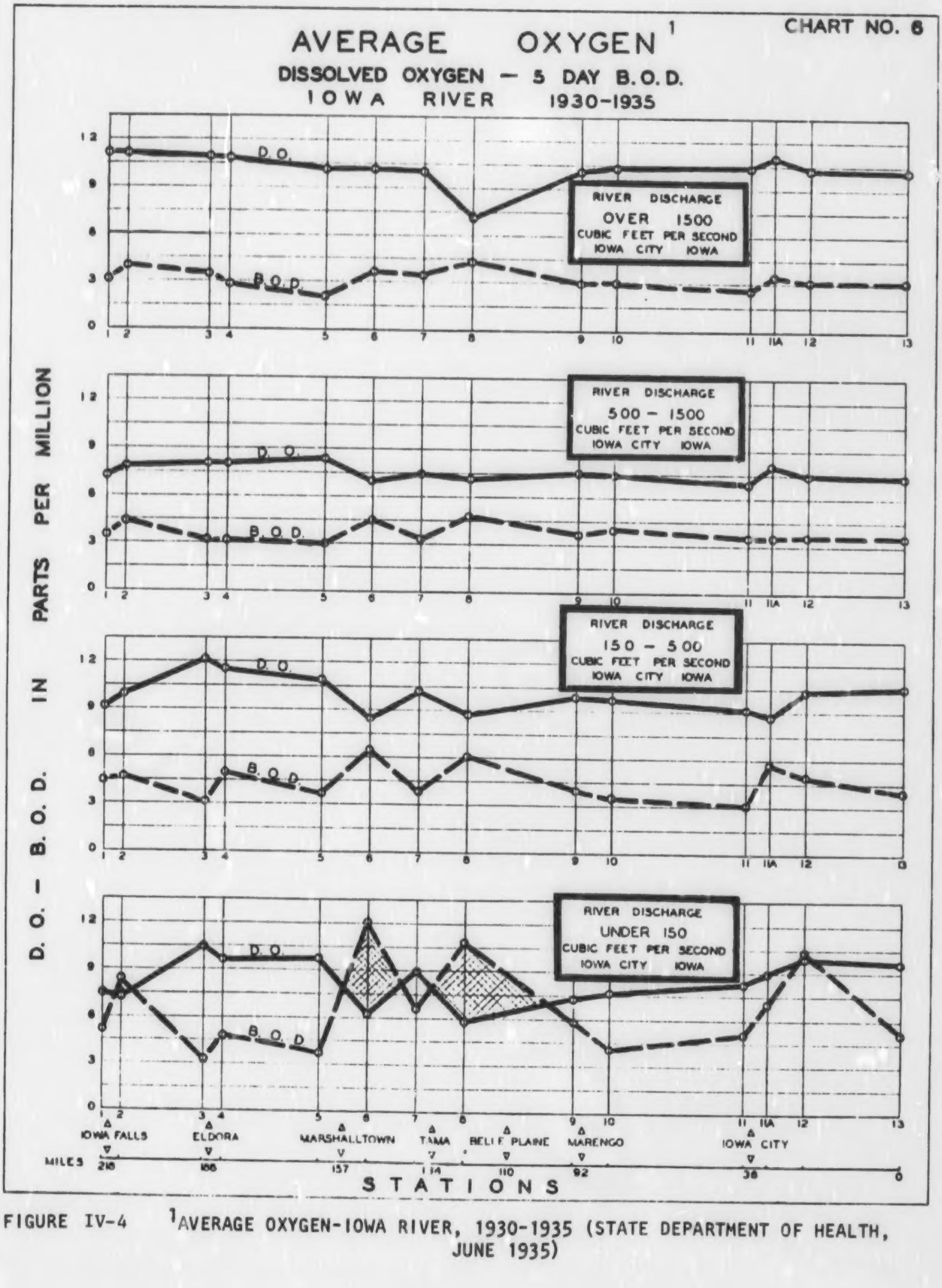


FIGURE IV-4 [1]AVERAGE OXYGEN-IOWA RIVER, 1930-1935 (STATE DEPARTMENT OF HEALTH, JUNE 1935)

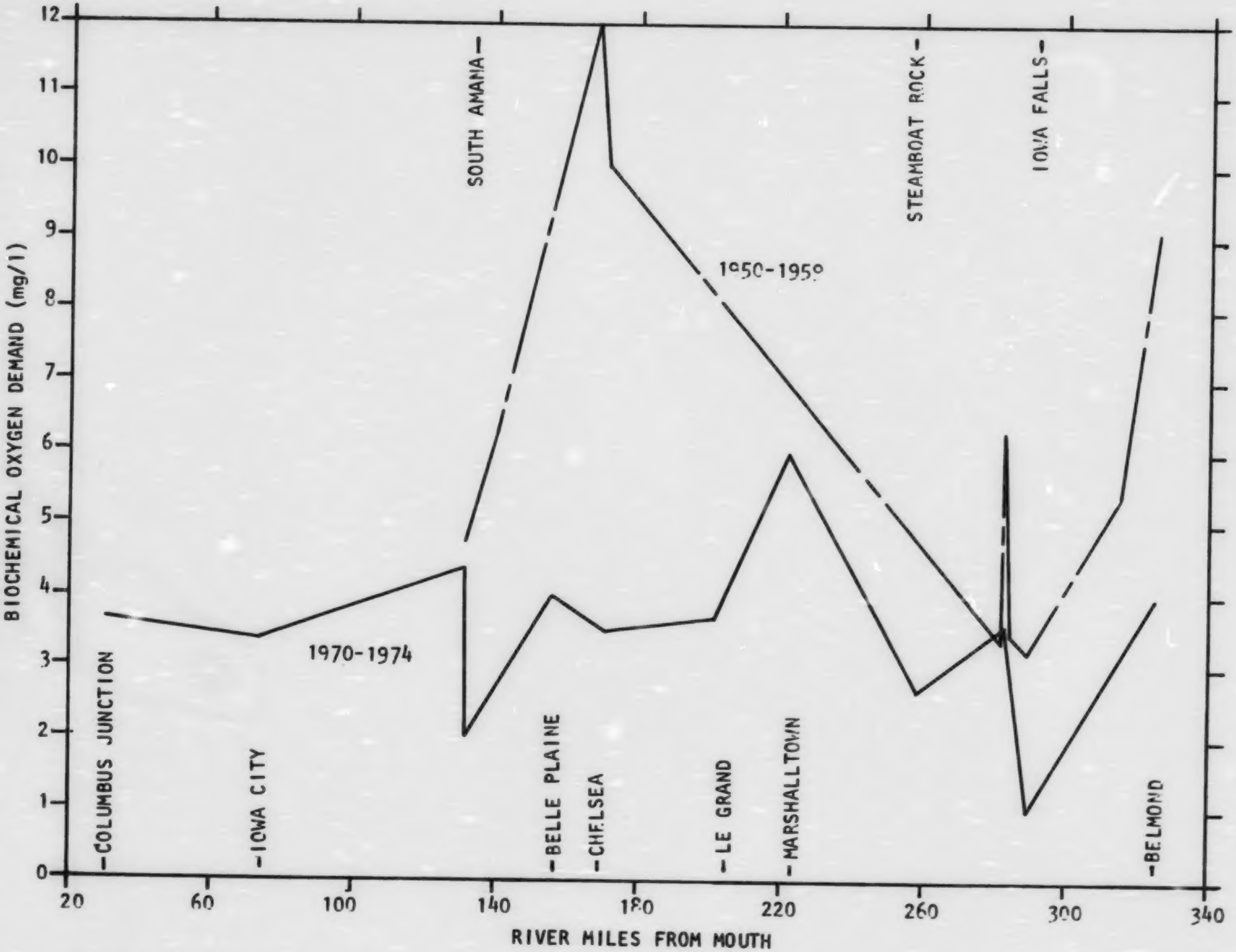


FIGURE IV-5 COMPARISON OF MEAN BIOCHEMICAL OXYGEN DEMAND CONCENTRATIONS FOR THE IOWA RIVER, 1950's-vs-1970's

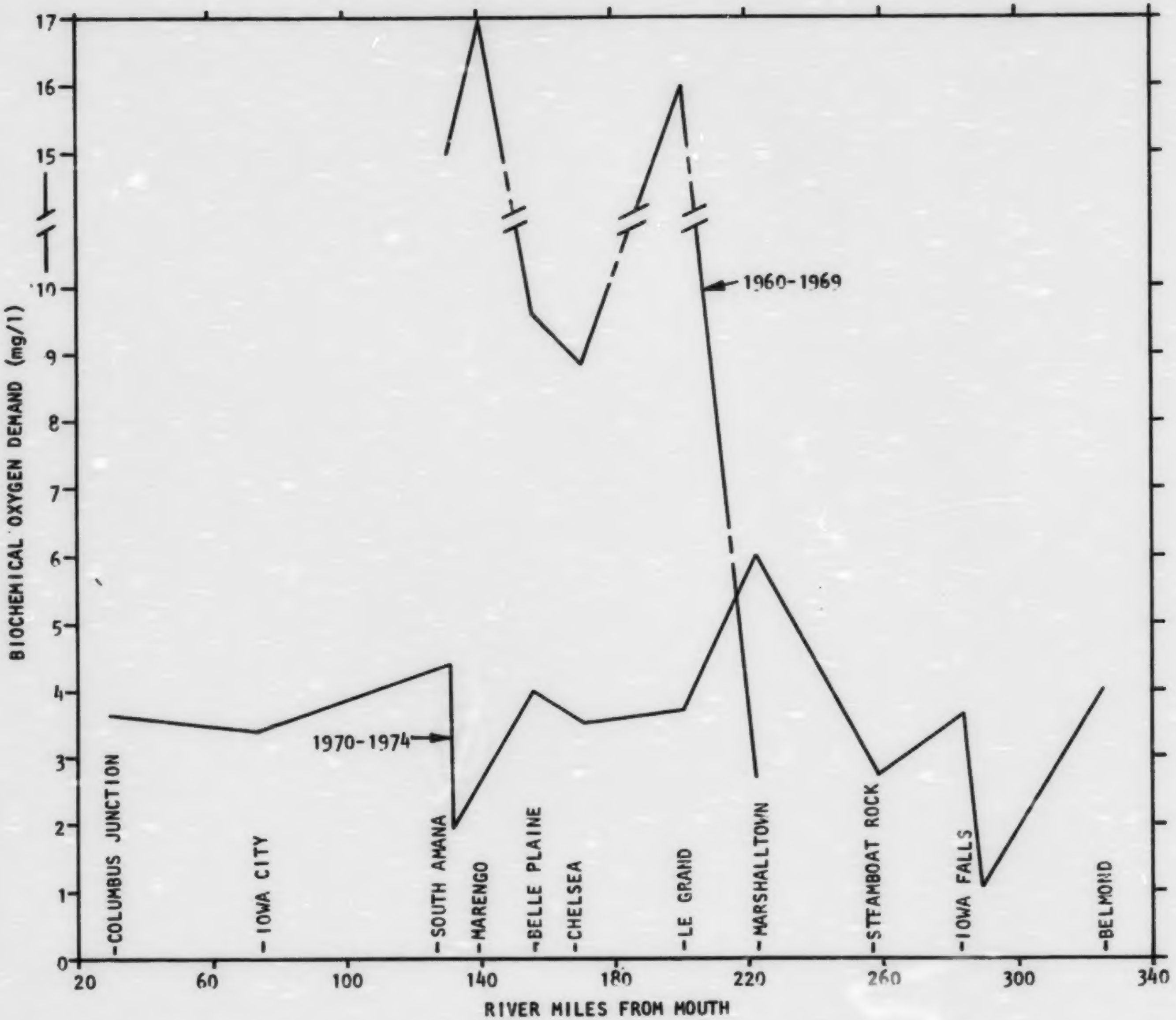


FIGURE IV-6 COMPARISON OF MEAN BIOCHEMICAL OXYGEN DEMAND CONCENTRATIONS FOR THE IOWA RIVER, 1960's-vs-1970's

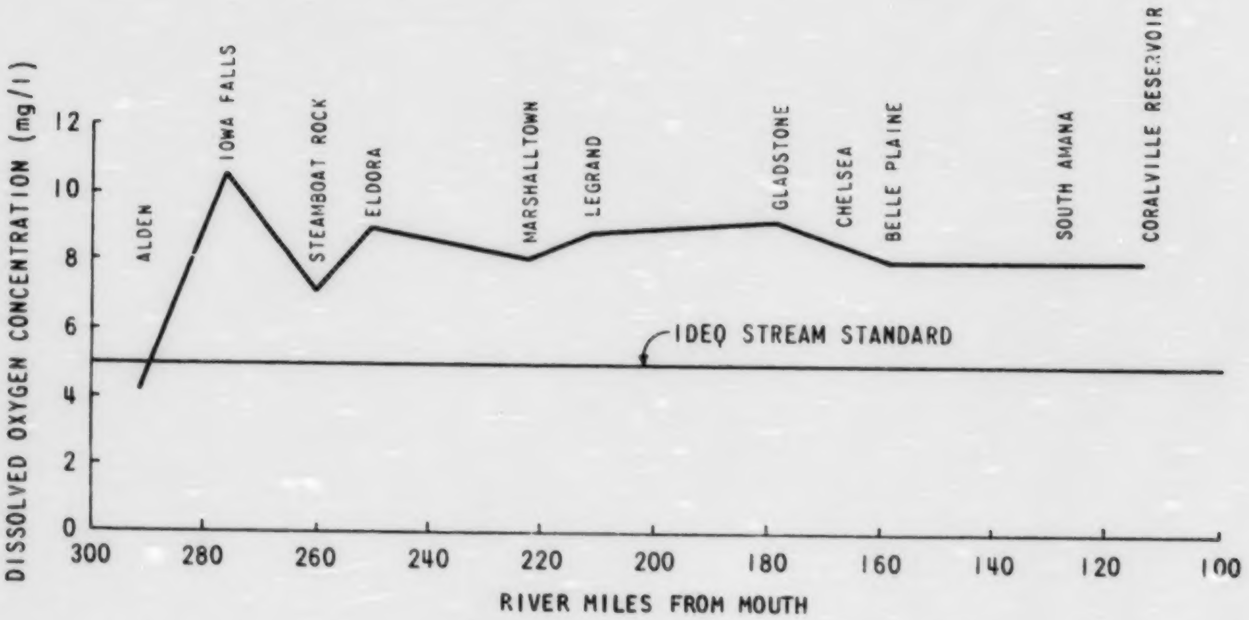


FIGURE IV-7 DISSOLVED OXYGEN CONCENTRATIONS, IOWA RIVER, FEBRUARY, 1971

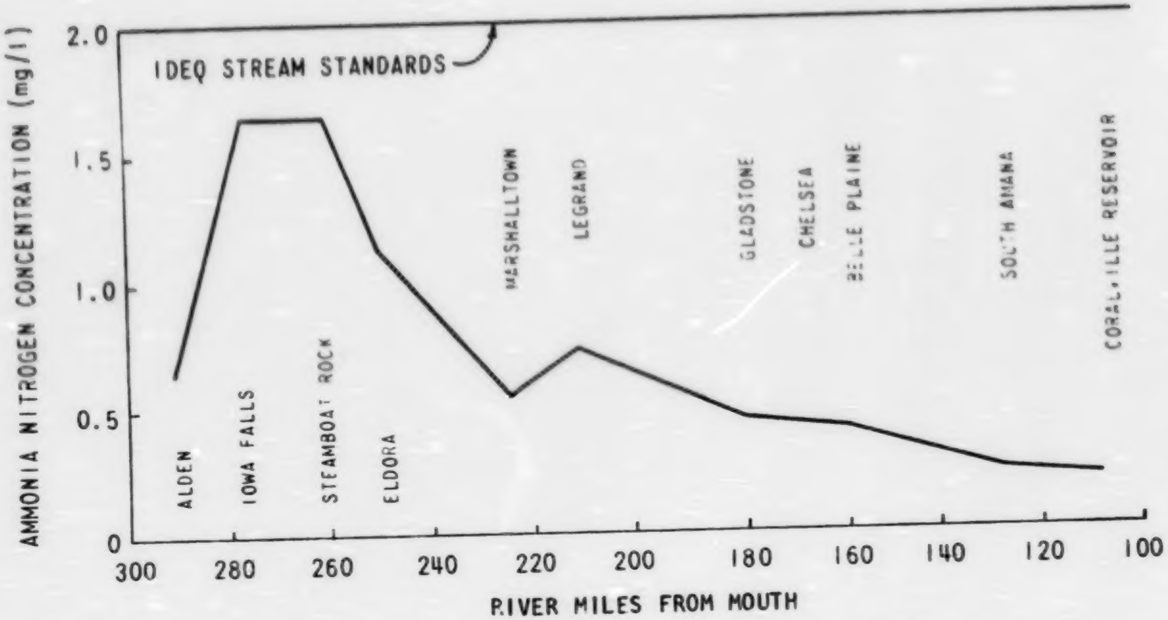


FIGURE IV-8 AMMONIA NITROGEN CONCENTRATIONS, IOWA RIVER, FEBRUARY, 1971

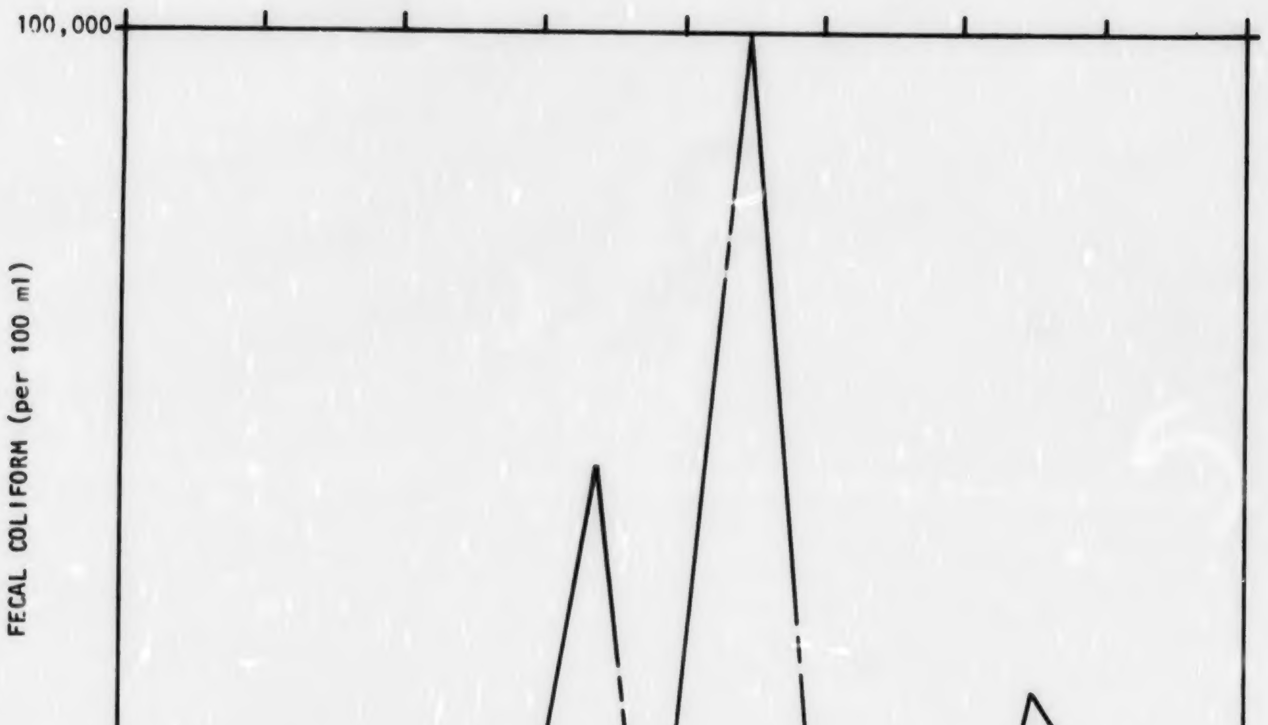


FIGURE IV-9 MEAN FECAL COLIFORM CONCENTRATIONS IN THE IOWA RIVER

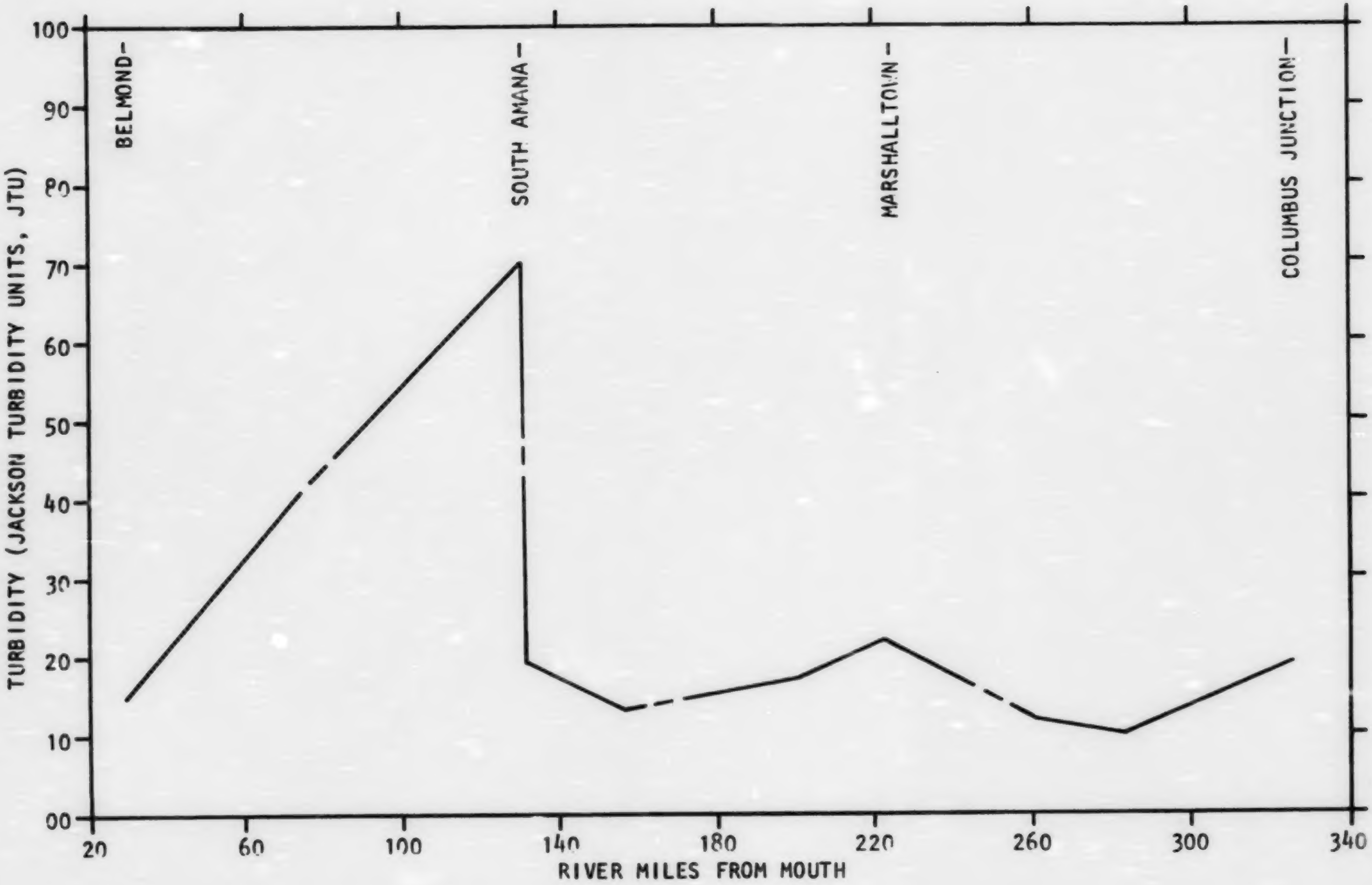


FIGURE IV-10 MEAN TURBIDITY CONCENTRATIONS IN THE IOWA RIVER, 1970-1974

CEDAR RIVER

Water quality in the Cedar River is generally good. Increased levels of pesticides, nutrients, bacteria and solids occur during heavy runoff. Increased BOD, ammonia, nutrients, bacteria and decreased dissolved oxygen occur below many of the point sources.

Data and Methods

Data collected on the entire Cedar River come primarily from the State Hygienic Laboratory and the DEQ. Data collected since 1971 by the University of Iowa, near Palo, above Cedar Rapids, were used for determination of seasonal and hydrological changes. These data have been collected twice monthly at four stations between Vinton and Cedar Rapids from 1971 to the present (1975), and are one of the most comprehensive river studies in the State in spite of its limited geographical scope.

In order to better evaluate water quality in the Cedar River, the river was divided into three sections: the upper, middle, and lower Cedar River. The upper Cedar River was defined as that portion of the Cedar above the confluence with the Shellrock/West Fork Cedar Rivers. The middle Cedar is that portion from the upper Cedar to Cedar Rapids. The lower Cedar River is that portion below Cedar Rapids.

Water Quality Conditions

Harmful Substances - Limited data have been collected on pesticides in the Cedar River. Concentrations of DDE, DDT, diedrin, and atrazine have been found in excess of recommended maximum concentrations established by the National Academy of Science. The concentration of pesticides found in fish is significant. Studies conducted on fish in the middle Cedar have found concentrations over 1,000 times as great as independently collected water samples. Concentrations of heptachlor, aldrin, heptachlor epoxide, DDE, DDT, lindane, and dieldrin have been found in fish in the middle Cedar. Total pesticide residues varied from 81 to 160 ppb in fish, compared to less than 100 parts per trillion in the water.

Violation of Iowa standards for the heavy metals copper, chromium and zinc have been found in the Cedar River. Heavy metals have generally been found more frequently in the upper Cedar than in the rest of the Cedar River combined. The City of Charles City, with the industrial impact of Salsbury Laboratories, is the only known discharger of heavy metals on this stream segment. The industrial waste impact will be reduced as a result of implementation of their discharge permit.

TABLE IV-6

PESTICIDES IN THE CEDAR RIVER

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (ng/l)	MAXIMUM (ng/l)
DDE	20	6	85	480
DDT	19	3	10	12
Dieldrin	19	9	13	42
Atrazine	1	1	6350	6350

TABLE IV-7

HEAVY METALS IN THE CEDAR RIVER BELOW WATERLOO

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (μg/l)	MAXIMUM (μg/l)
As	8	0		
Ba	15	12	167	600
Cd	15	0		
Cr	36	0		
Cu	35	7	87	140
Pb	31	2	55	90
Mn	32	6	37	50
Hg	16	0		
Ni	15	0		
Ag	7	0		
Zn	35	29	42	160

TABLE IV-8

HEAVY METALS IN THE CEDAR RIVER BELOW CEDAR RAPIDS

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (μg/l)	MAXIMUM (μg/l)
As	6	0		
Ba	8	7	200	400
Cd	49	0		
Cr	55	0		
Cu	48	1	10	10
Pb	8	1	70	70
Mn	4	3	86	160
Hg	6	0		
Ni	41	0		
Ag	0	0		
Zn	48	27	103	210
Se	1	1	1	1

TABLE IV-9

HEAVY METALS IN THE CEDAR RIVER ABOVE WATERLOO

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (μg/l)	MAXIMUM (μg/l)
As	25	2	45	70
Ba	24	23	552	1000
Cd	36	0		
Cr	37	2	7200	12000
Cu	36	3	13	20
Pb	36	3	320	660
Mn	20	13	48	160
Hg	8	2	3.6	4.0
Ni	34	1	20	20
Ag	12	0		
Zn	36	23	458	5800
Se	1	1	1	1

Physical Modification - Nonpoint sources of runoff have caused significant increases in turbidity in the Cedar River. Maximum turbidity found since 1970 is about 430 JTU which occurred during a period of very high flow and an unusually wet year.

Temperature studies, related to cooling water discharges, have not been complete enough to identify specific problems regarding physical modification. The number of cooling water discharges and the volume of cooling water used suggest that further studies are needed to determine the magnitude of this problem on the Cedar River.

Eutrophication Potential - Nitrate and phosphate are both found in abundance in the Cedar River. Nonpoint sources seem to be associated with this problem, but no definite conclusions can be drawn from available data. It is probable that, at least in the middle and lower Cedar, point sources also contribute significant amounts of nutrients.

Due to the adequate supply of nutrients, the Cedar River frequently supports large plankton populations, with totals in excess of 100,000 organisms per ml. These large populations usually occur in the spring and summer, with occasional rapid die-offs. These declines are often associated with increased runoff and turbidity. The diatom Cyclotella is most commonly found, although other varieties of diatoms and green algae

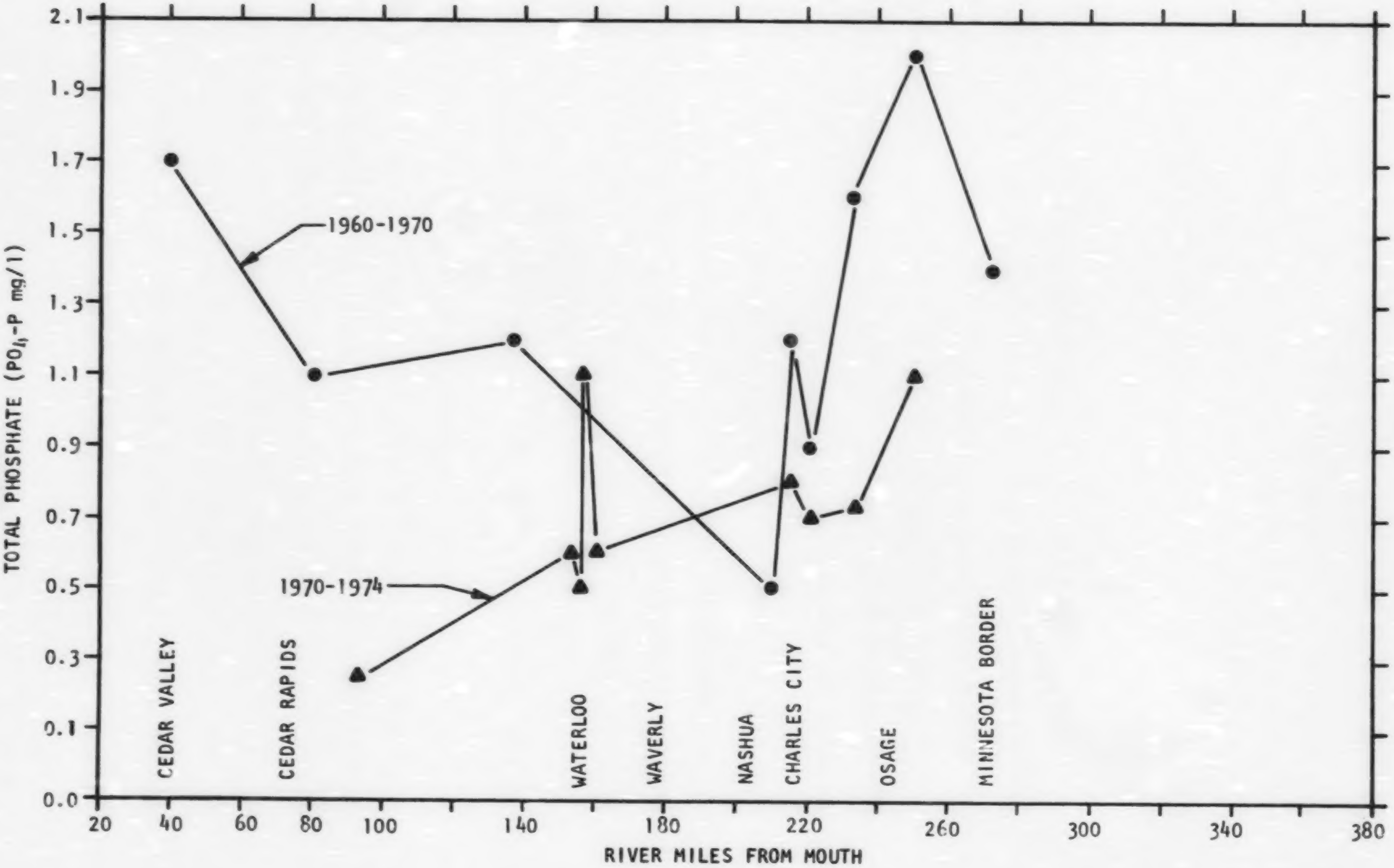


FIGURE IV-11 COMPARISON OF MEAN TOTAL PHOSPHATE CONCENTRATIONS IN THE CEDAR RIVER, 1960's-vs-1970's

are also present. Blue-green algae, primarily Oscillatoria, seem to reach maximum concentrations in the late summer. Lowest algal populations occur in the winter and during high runoff (McDonald, 1972).

Salinity, Acidity, and Alkalinity - The total dissolved solids concentration in the Cedar River is generally similar to that of other Iowa streams. Average dissolved solids concentrations are around 270 mg/l. Maximum concentrations of 791 mg/l have been found which are in violation of the Iowa Water Quality Standard of 750 mg/l. The source of this high dissolved solids cannot be determined with the limited data available. Data collected in the middle Cedar River in 1973 identified total dissolved solids ranging from 154 mg/l to 595 mg/l (McDonald, 1974).

Oxygen Depletion - Dissolved oxygen, BOD, and ammonia concentrations in the Cedar River have been primarily influenced by point source discharges for many years. Significant peaks in BOD and depressed dissolved oxygen could be seen below Waterloo and Cedar Rapids in the 1920's (Figures IV-12 and IV-13). It is difficult to evaluate recent trends of dissolved oxygen, BOD, and ammonia in the Cedar River. Peaks in BOD and ammonia are still generally associated with the same point sources as in previous decades (Figures IV-14 through IV-18). BOD concentrations at Cedar Rapids appear

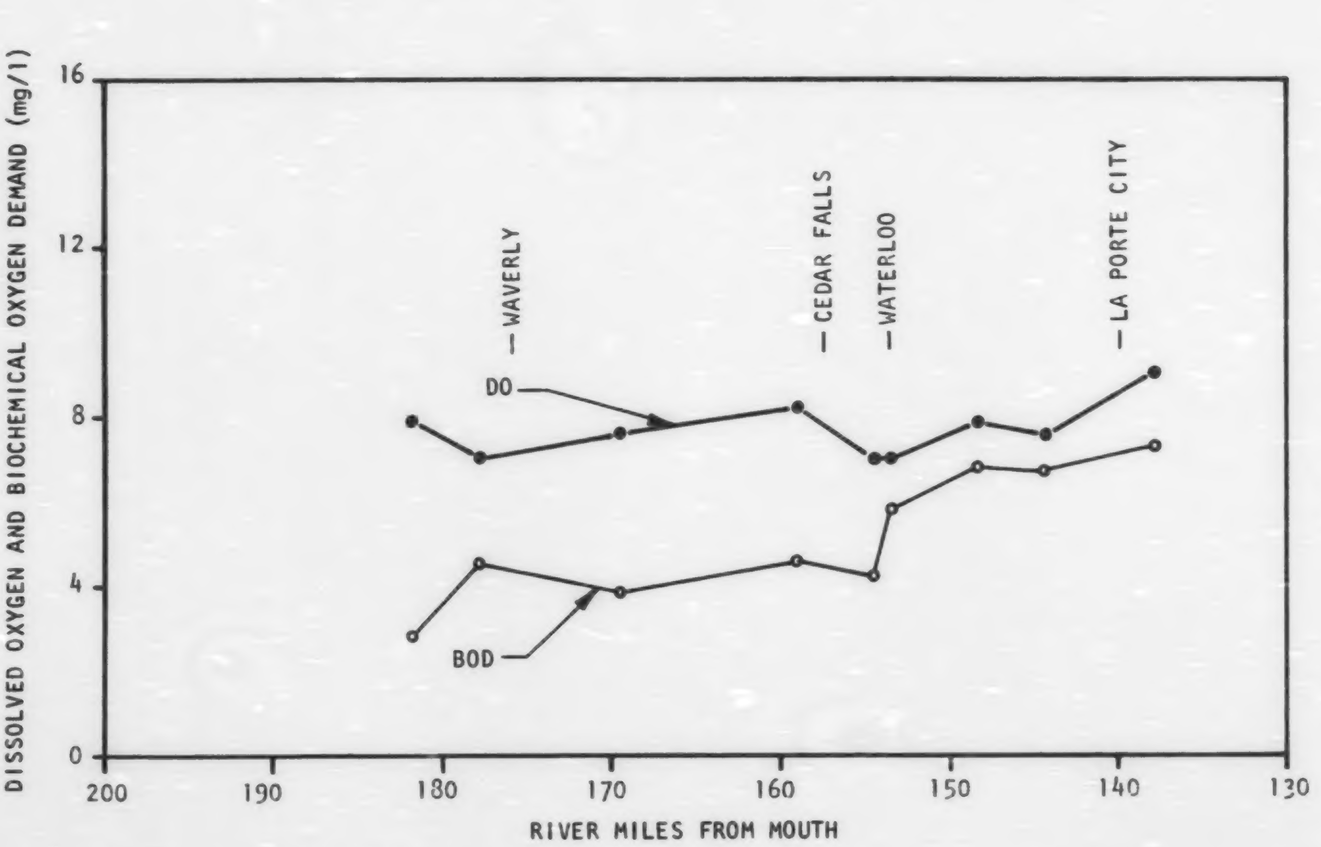


FIGURE IV-12 MEAN DISSOLVED OXYGEN AND BOD CONCENTRATIONS FOR THE CEDAR RIVER, 1926-1927

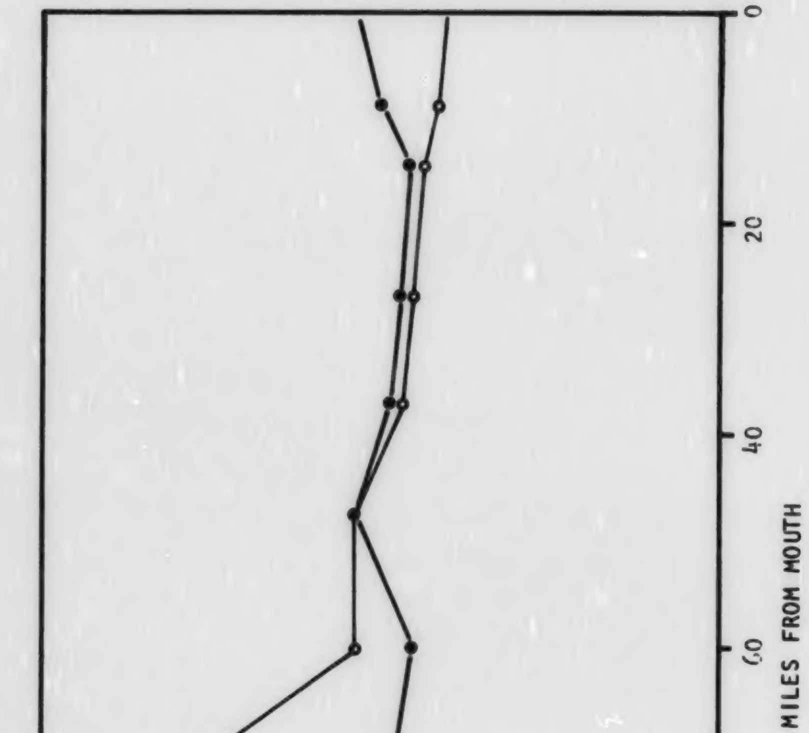


FIGURE IV-13 MEAN DISSOLVED OXYGEN AND BOD CONCENTRATIONS FOR THE CEDAR RIVER, 1927-1928

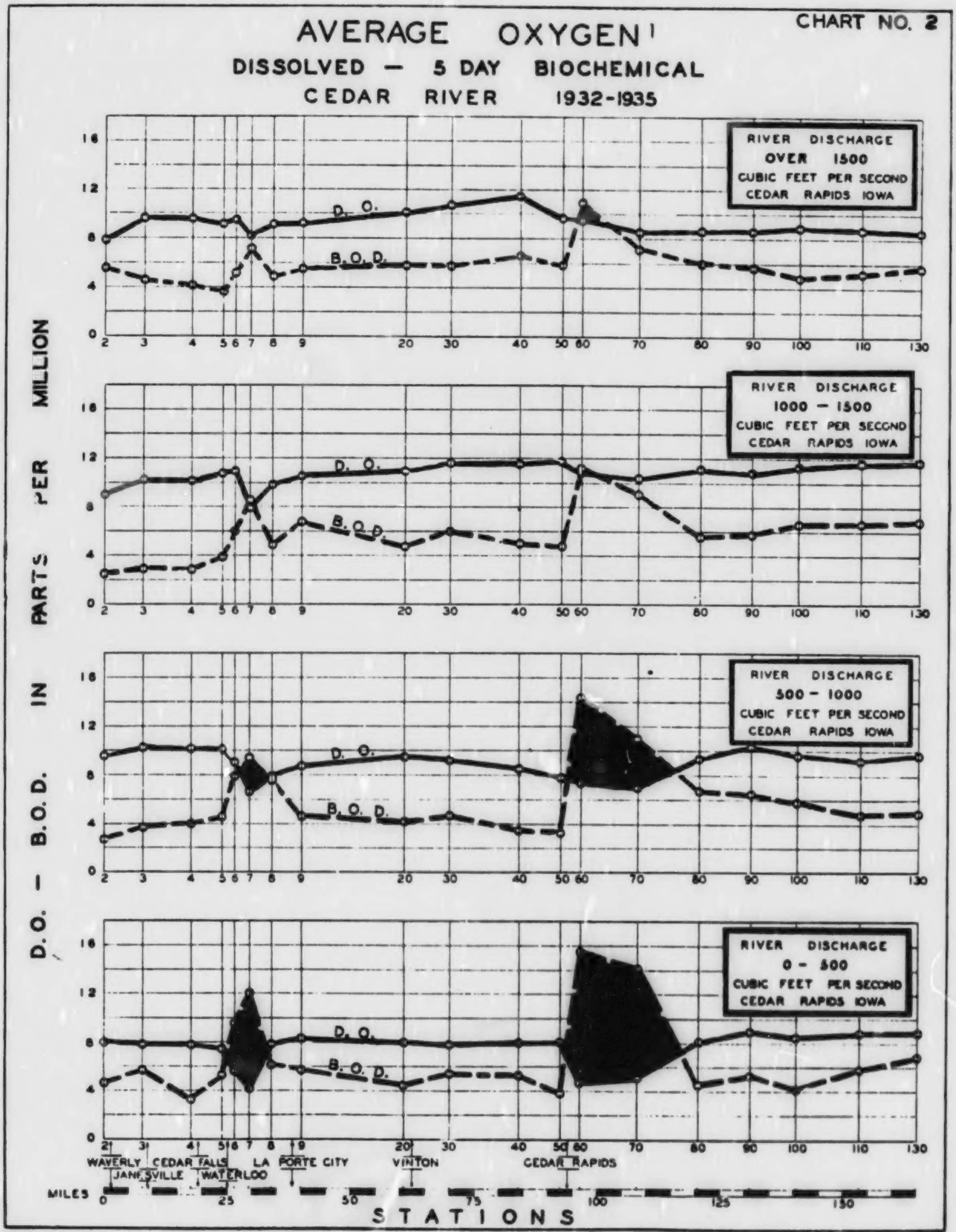


FIGURE IV-14 ¹AVERAGE OXYGEN-CEDAR RIVER, 1932-1935 (STATE DEPARTMENT OF HEALTH, MAY, 1935)

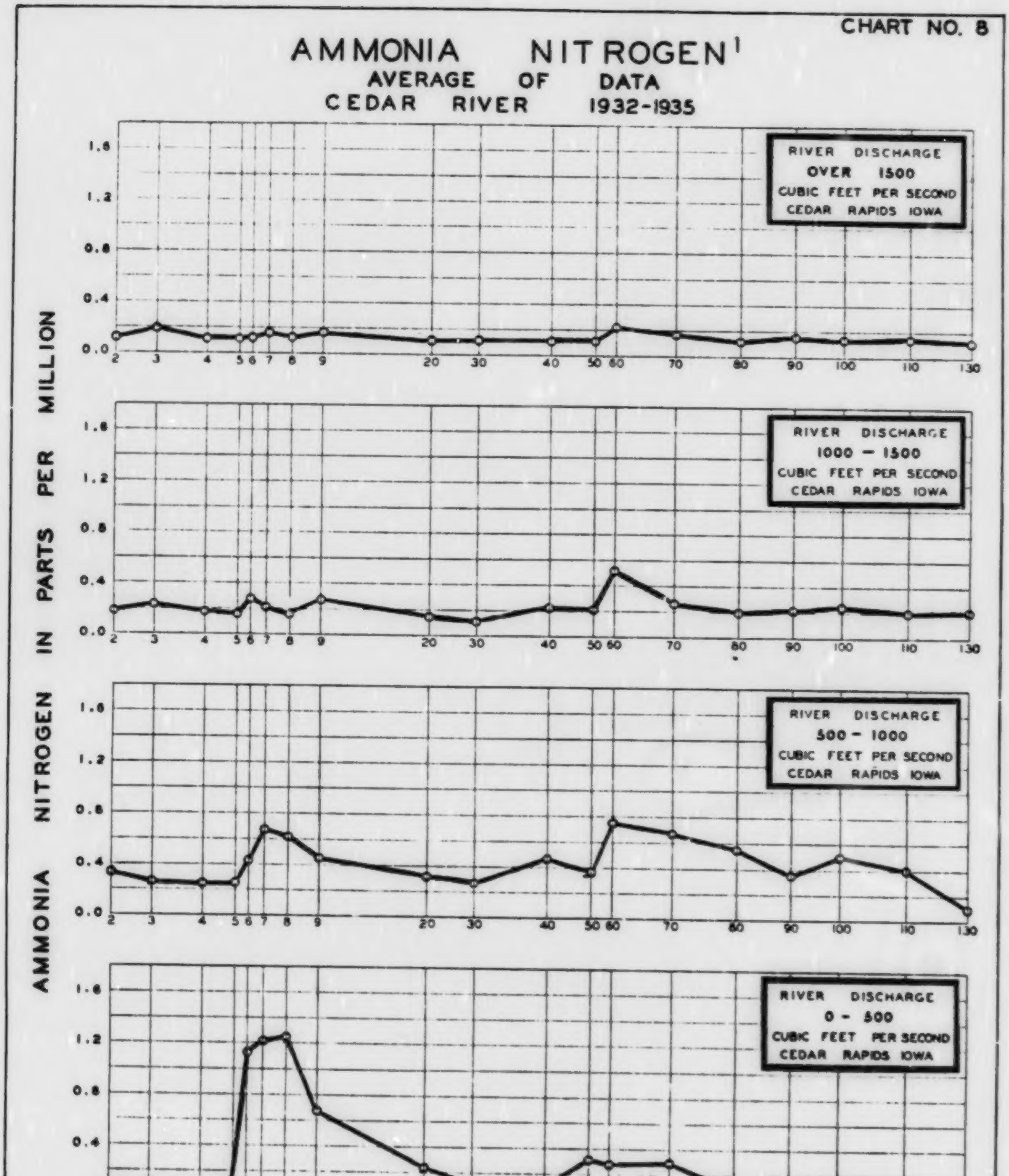


FIGURE IV-15 [1]AVERAGE AMMONIA NITROGEN-CEDAR RIVER, 1932-1935 (STATE DEPARTMENT OF HEALTH, MAY 1935)

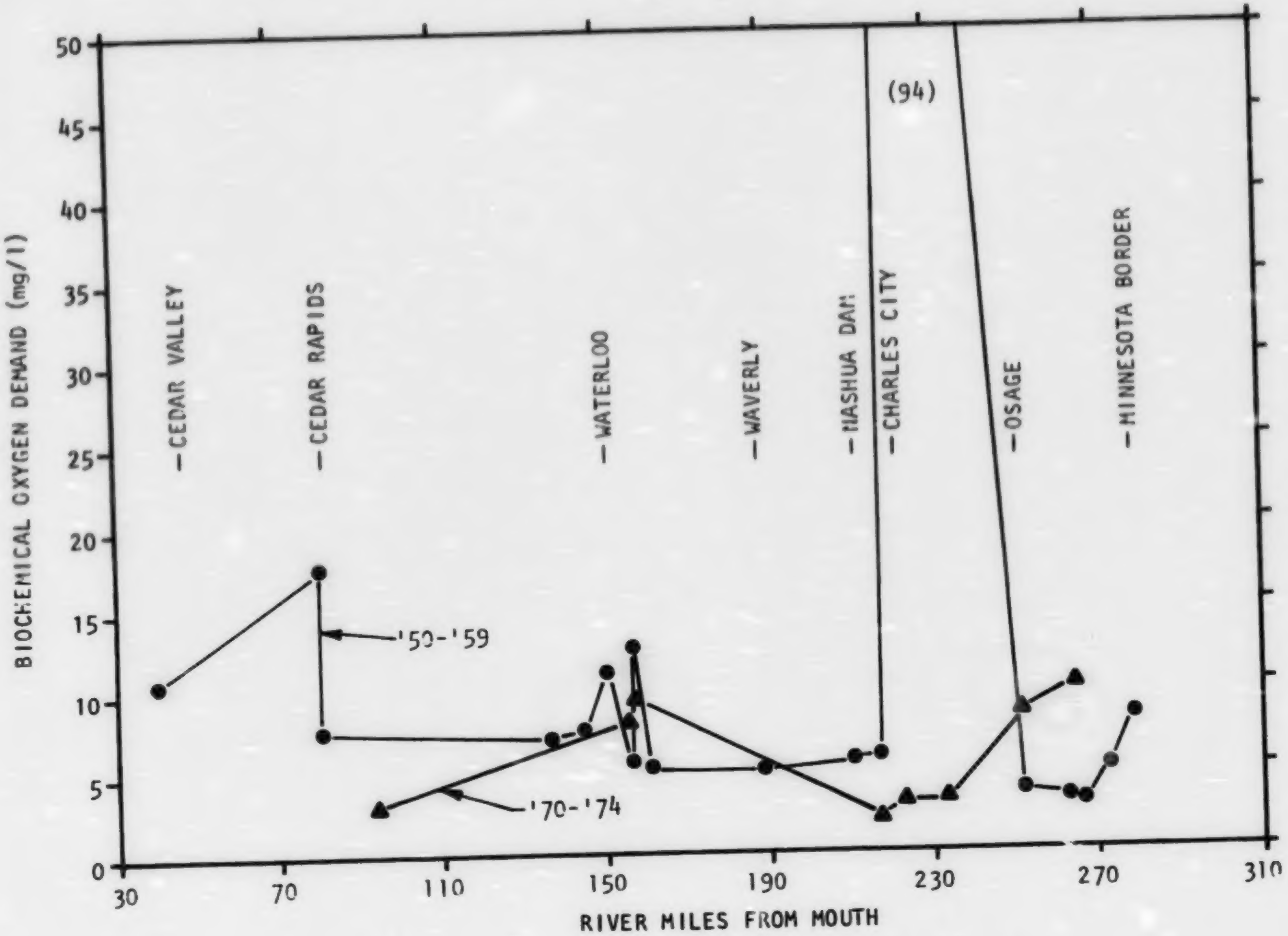


FIGURE IV-16 COMPARISON OF MEAN BIOCHEMICAL OXYGEN DEMAND IN THE CEDAR RIVER, 1950's vs 1970's

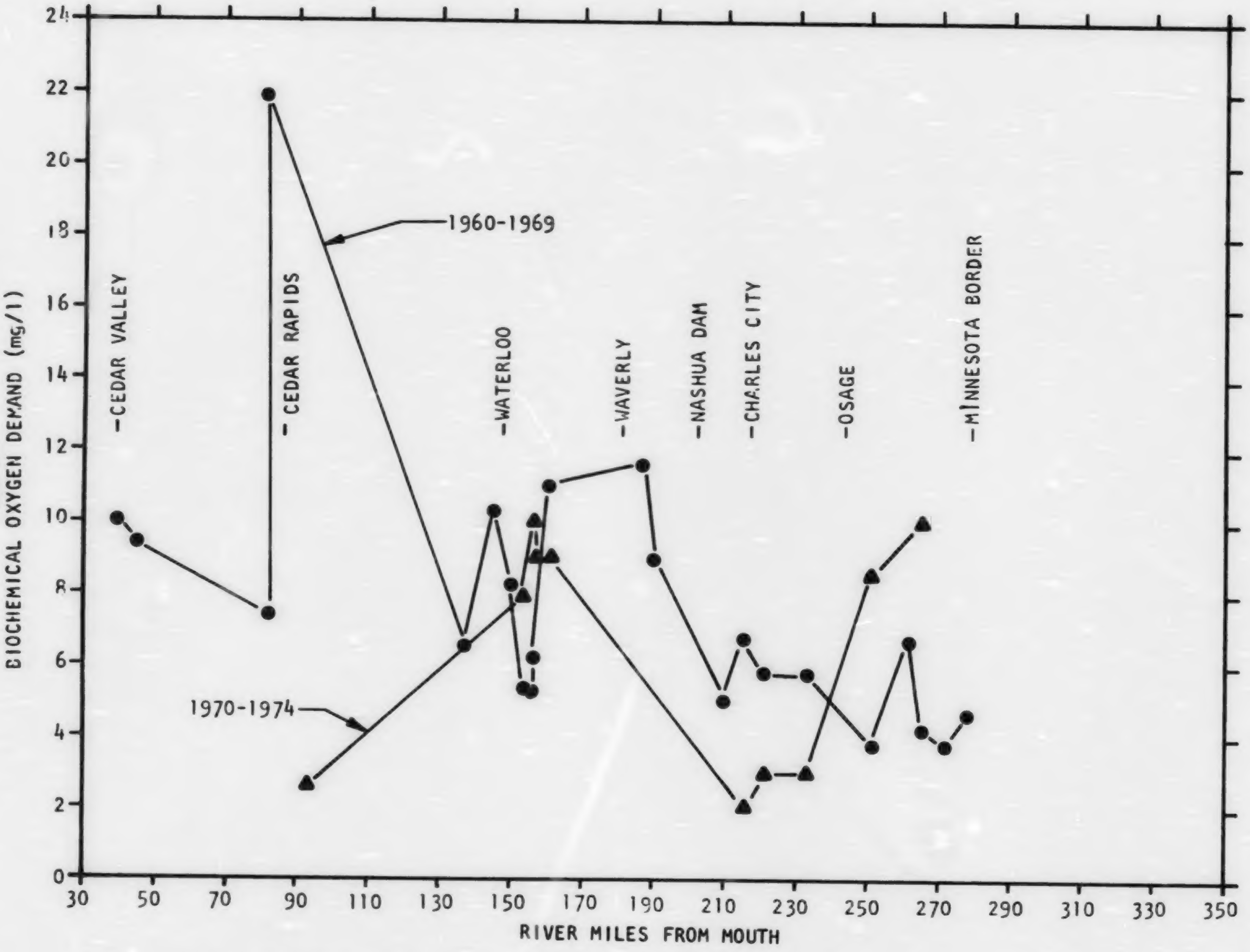


FIGURE IV-17 COMPARISON OF MEAN BIOCHEMICAL OXYGEN DEMAND IN THE CEDAR RIVER, 1960's vs 1970's

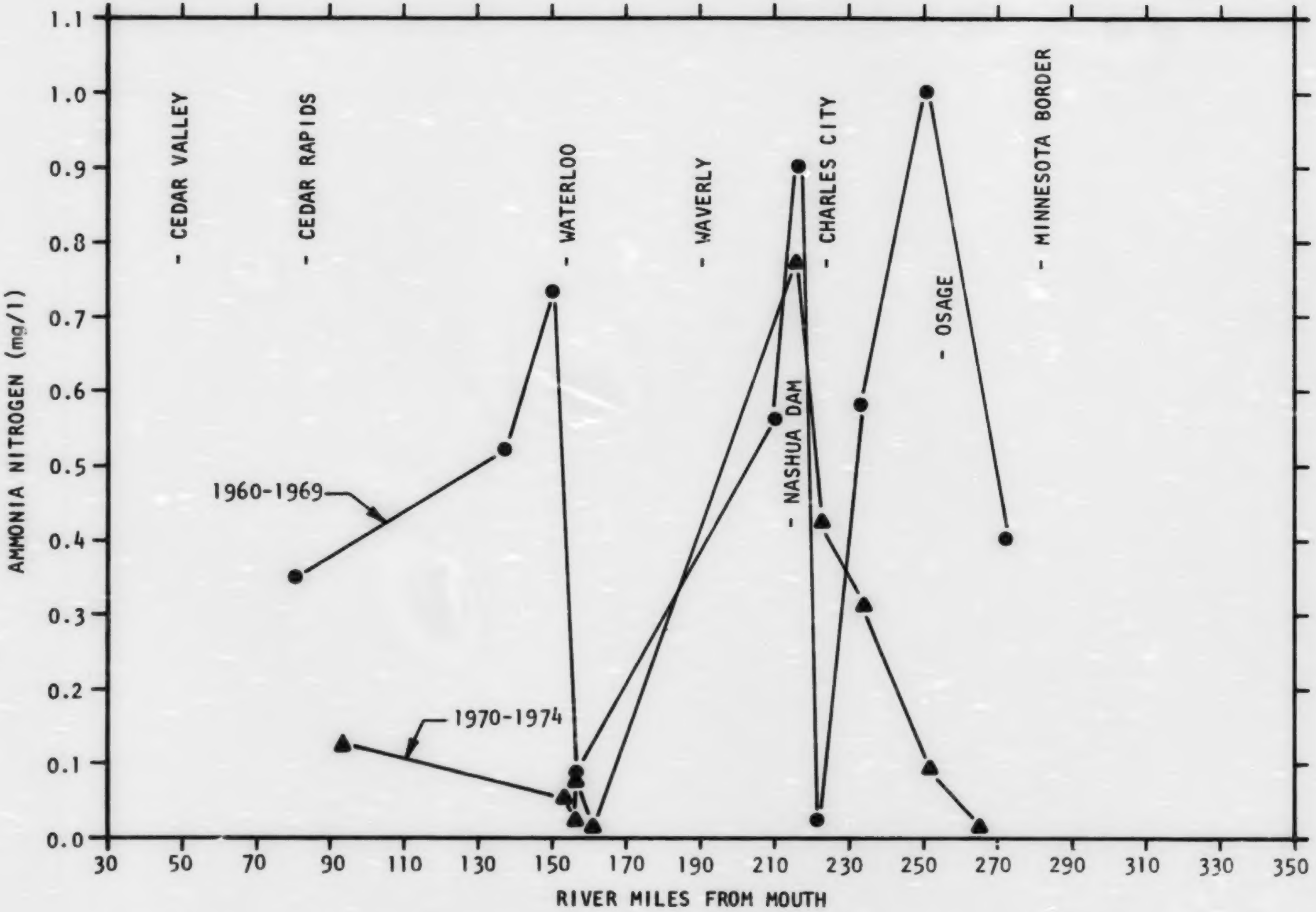


FIGURE IV-18 COMPARISON OF MEAN AMMONIA NITROGEN CONCENTRATIONS IN THE CEDAR RIVER, 1960's vs 1970's

much lower than in previous decades, while at Waterloo, little change is apparent. In the upper Cedar River, from near Osage north to the Minnesota border, the BOD concentrations appear higher than in either the 1950's or the 1960's. The source of this waste is unclear, but the concentrations tend to decrease going downstream. This may indicate sources from Minnesota providing additional loading to the upper Cedar.

Ammonia concentrations, generally, have decreased on the Cedar River with the exception of the segment from Charles City to Waverly (Figure IV-18). Ammonia nitrogen violations have been found less frequently. Dissolved oxygen violations on the Cedar River have also decreased. In spite of this general improvement, other data suggests that additional treatment at some discharges is desirable. Samples collected biweekly, above and below the Cedar Rapids wastewater treatment plant discharge, by plant personnel continue to show dissolved oxygen violations. These data are not included in the above cited figures because of the inability to compile the data for this report. These data constitute a much more comprehensive study of conditions below the Cedar Rapids treatment plant than any study heretofore available.

Flow in the Cedar River the last few years has been extremely high. Low flow conditions may alter considerably the picture of improvement that was described above. Water quality violations of dissolved oxygen and ammonia might be expected during low flow periods on the Cedar River. Dissolved oxygen reductions below both Waterloo and Cedar Rapds suggest that lower flows and increased sampling would find conditions that violate Iowa Water Quality Standards.

Health Hazards and Aesthetic Degradation - Fecal and coliform concentrations fluctuate widely. Highest concentrations are generally associated with point sources and runoff conditions. High counts frequently occur at the beginning of periods of rainfall while low counts are usually found during low runoff periods or after extended periods of high runoff.

Color problems on the upper Cedar River are more severe than anywhere else in the State. A yellowish-orange discharge at Charles City is often visible at the Nashua dam and has been observed as far downstream as Waverly, nearly forty miles downstream. This color is due, in part, to various organic chemicals including nitroaniline compounds which are produced by Salsbury Laboratories at Charles City. Color limitations set, in the Charles City discharge permit, to take effect upon completion of adequate treatment facilities should eliminate this problem from the river.

It is difficult to discuss water quality in the Cedar River without mentioning the taste and odor problems near Cedar

Rapids in the early 1960's. This problem was eventually traced to actinomycetes bacteria. The cause of the extreme increases in the population of these bacteria or the sudden decrease and elimination of the problem has not been confirmed, although numerous studies and publications have discussed this episode in detail.

SHELLROCK RIVER

The most notable pollution problems on the Shellrock River are dissolved oxygen and ammonia nitrogen concentrations which often violate Iowa Water Quality Standards and endanger aquatic life. The source of the majority of the pollution is from outside of the State, at Albert Lea, Minnesota. Profiles of the river generally show decreasing ammonia, phosphate, fecal coliform, and biochemical oxygen demand from the Minnesota border to the mouth. Increasing dissolved oxygen can be observed over the same reach.

Water Quality Conditions

Harmful Substances - Pesticide studies have not been conducted on the Shellrock River. Heavy metal samples collected to date identify barium, copper, lead, manganese, and zinc. Only lead and copper concentrations have exceeded Iowa standards.

Physical Modification - The magnitude of turbidity and suspended solids problems is considerably less than many Iowa streams. This is partly due to the fact that the river originates from Albert Lea Lake, that the drainage area is somewhat smaller, and the lack of straightening and channelization have kept erosion of the river banks down.

Salinity, Acidity and Alkalinity - Total dissolved solids data for the Shellrock have averaged about 400 mg/l with a maximum of 589 mg/l. Chloride data have averaged 30 mg/l.

TABLE IV-10

HEAVY METALS IN THE SHELLROCK RIVER

PARAMETER	TOTAL SAMPLES	NUMBER OF SAMPLES WITH DETECTABLE LEVELS	MEAN OF THOSE WITH DETECTABLE LEVELS (ug/l)	MAXIMUM (ug/l)
As	10	0		
Ba	16	12	158	400
Cd	0			
Cr	18	0		
Cu	16	1	50	50
Pb	16	2	580	740
Mn	13	7	73	170
Hg	2	0		
Ni	14	0		
Ag	7	0		
Zn	16	8	125	330

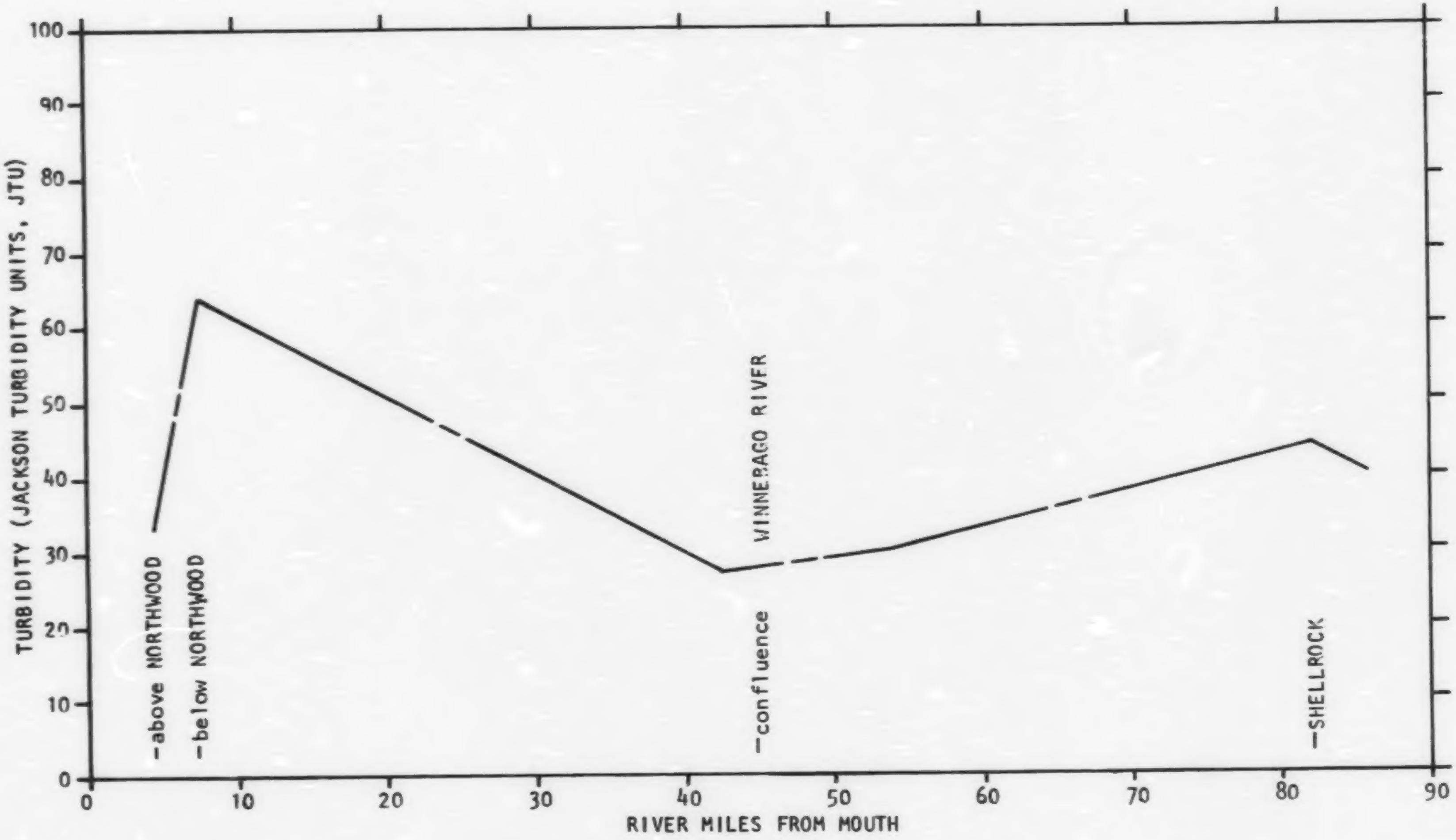


FIGURE IV-19 MEAN TURBIDITY IN THE SHELLROCK RIVER, 1970-1974

Alkalinity is similar to many other Iowa streams. Data average 243 mg/l with a maximum of 366 mg/l as $CaCO_3$. All of these levels could be described as background and no doubt do not indicate pollution involving these parameters.

Eutrophication Potential - High nitrate and phosphate concentrations are common in the upper Shellrock River. This is mainly the result of discharge from point sources in Minnesota and at Northwood, Iowa. Average of phosphate and nitrate data in the Shellrock River are 0.43 mg/l and 2.34 mg/l respectively. Nonpoint sources are probably a contribution to high nutrient concentrations at high flow; however, the influence of point sources has been most apparent.

Oxygen Depletion - Dissolved oxygen, BOD, and ammonia concentrations are the most serious pollution problems in the Shellrock River. Measurements concerning DO and BOD have been conducted sporadically since 1926 by the Department of Environmental Quality and predecessor organizations. Data collected in 1925 and 1926 indicated that the greatest pollution on the Shellrock was coming from point sources on the Winnebago River, particularly at Mason City. Studies at that time found low dissolved oxygen and odors downstream from the Winnebago River at Marble Rock and Greene. Though there is still concern for the pollution of point sources on the

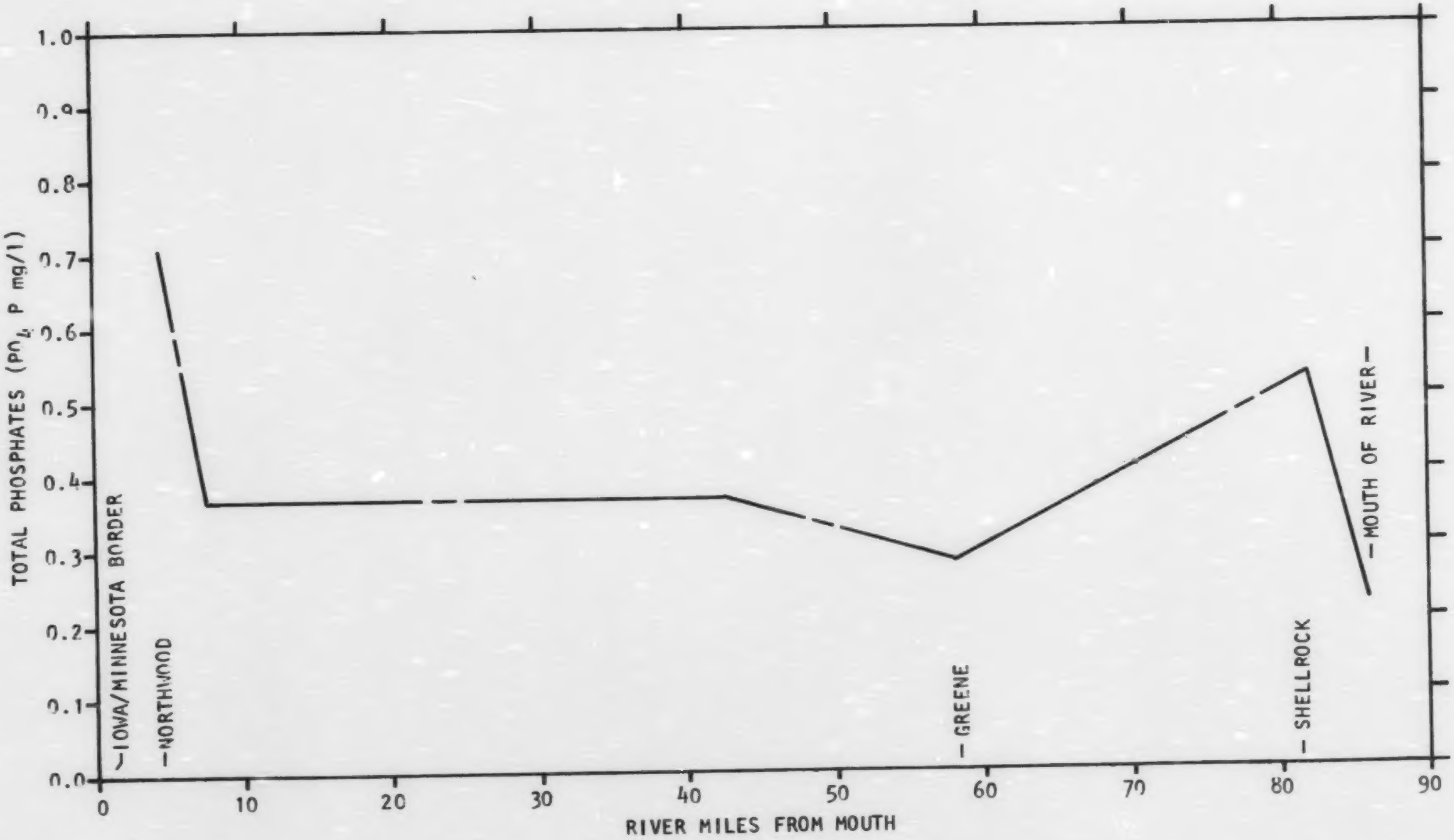


FIGURE IV-20 MEAN TOTAL PHOSPHATE CONCENTRATIONS IN THE SHELLROCK RIVER, 1970-1974

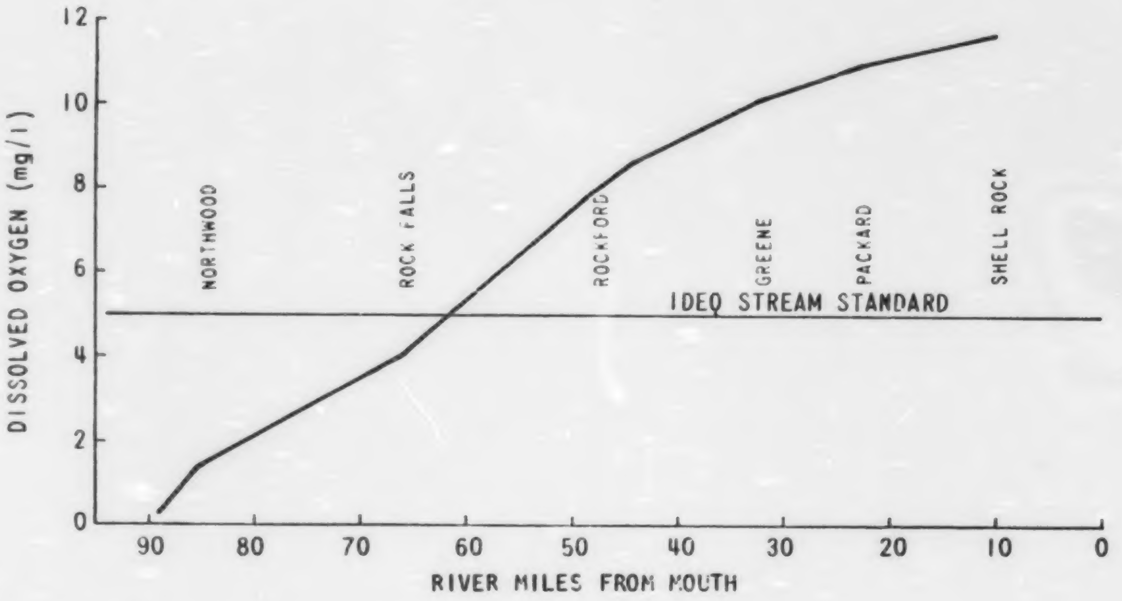


FIGURE IV-21 DISSOLVED OXYGEN CONCENTRATIONS SHELL ROCK RIVER, 1970

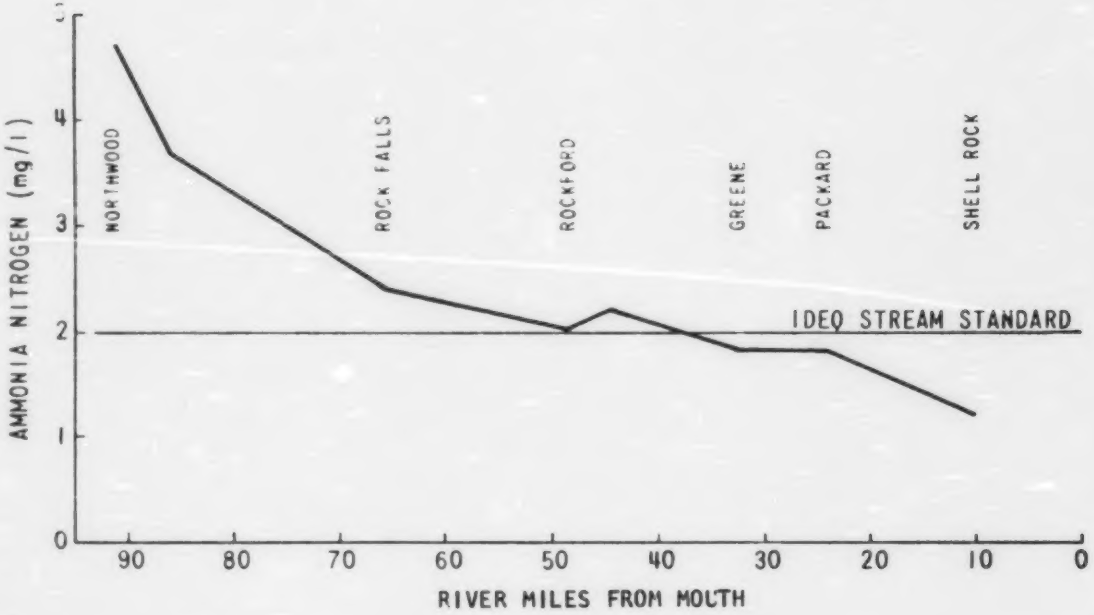


FIGURE IV-22 AMMONIA NITROGEN CONCENTRATIONS SHELL ROCK, RIVER-1970

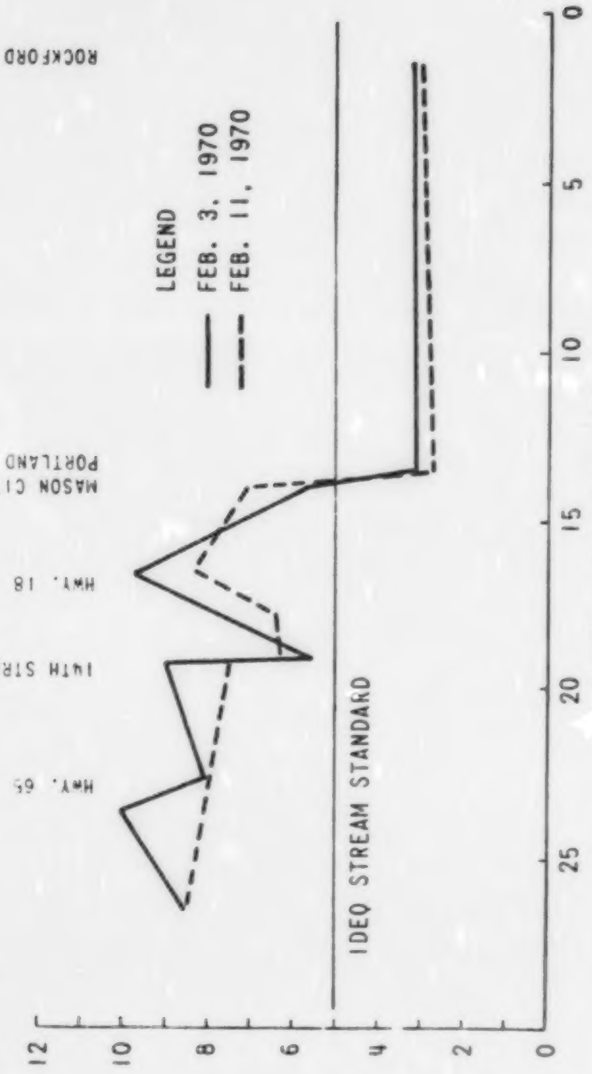


FIGURE IV-23 DISSOLVED OXYGEN CONCENTRATIONS, WINNEBAGO RIVER-1970

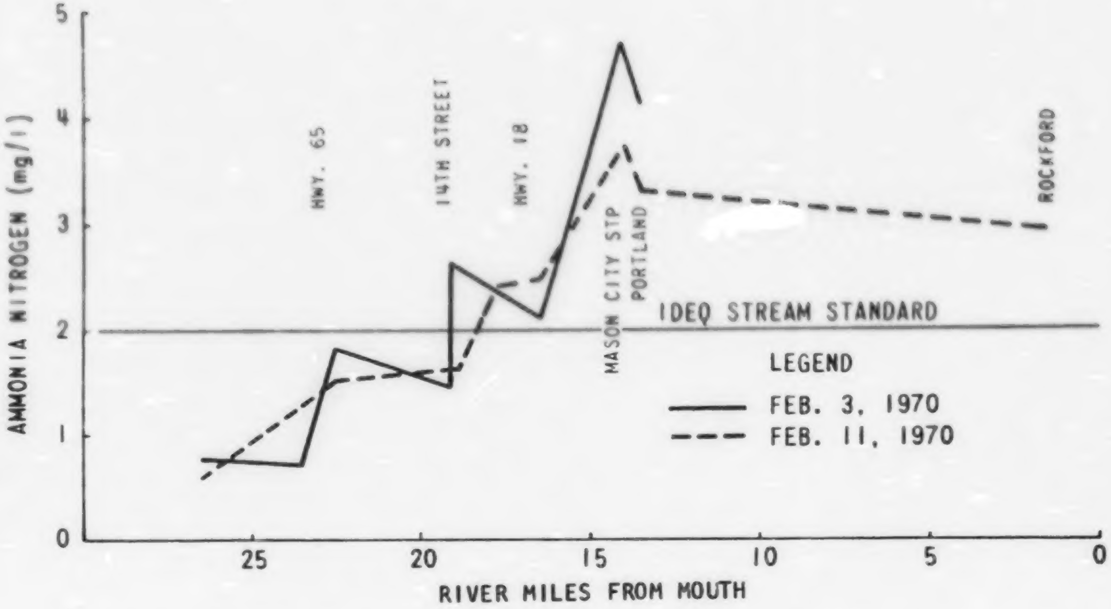


FIGURE IV-24 AMMONIA NITROGEN CONCENTRATIONS, WINNEBAGO RIVER-1970

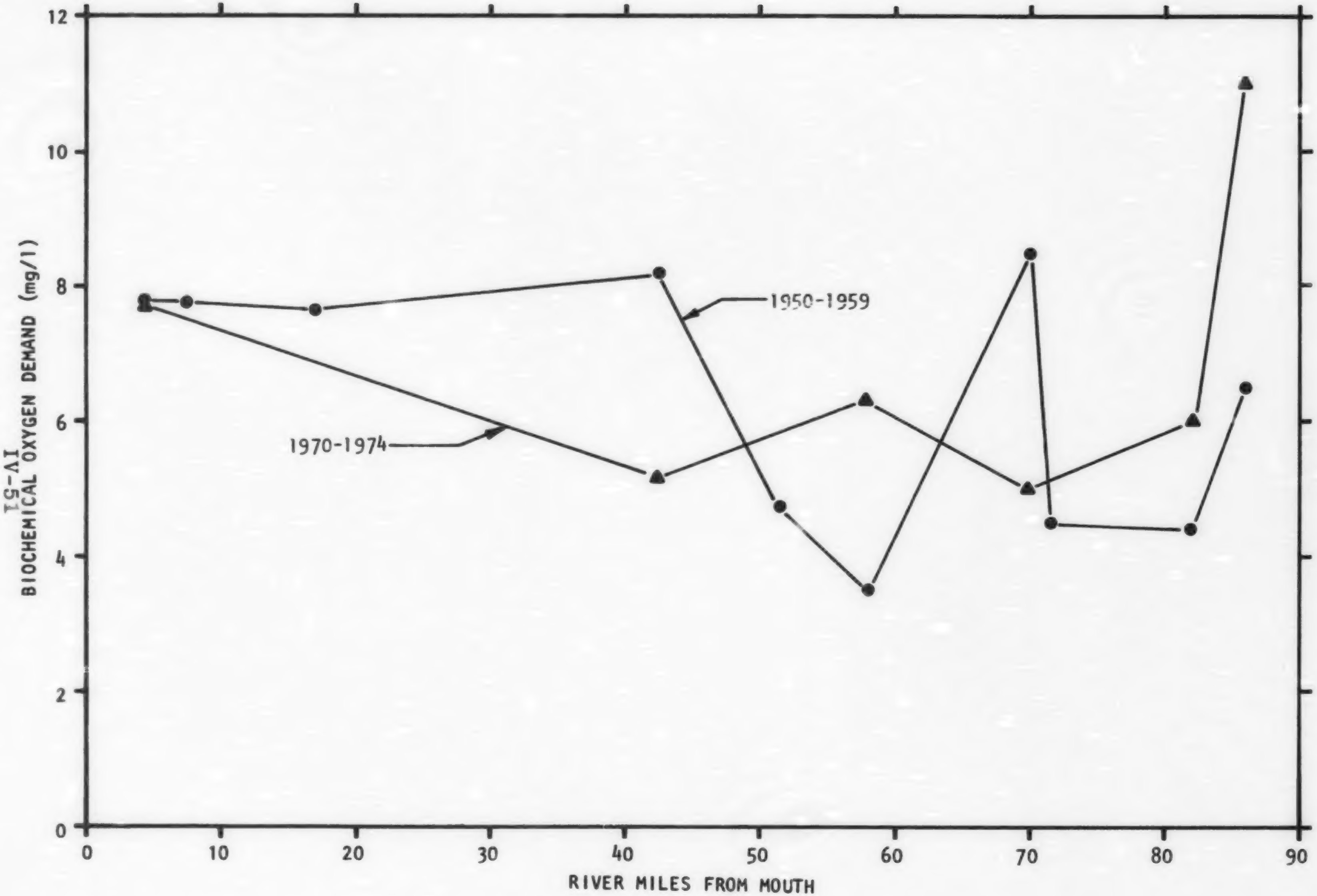


FIGURE IV-25 COMPARISON OF MEAN BIOCHEMICAL OXYGEN DEMAND IN THE SHELLROCK RIVER, 1950's vs 1970's

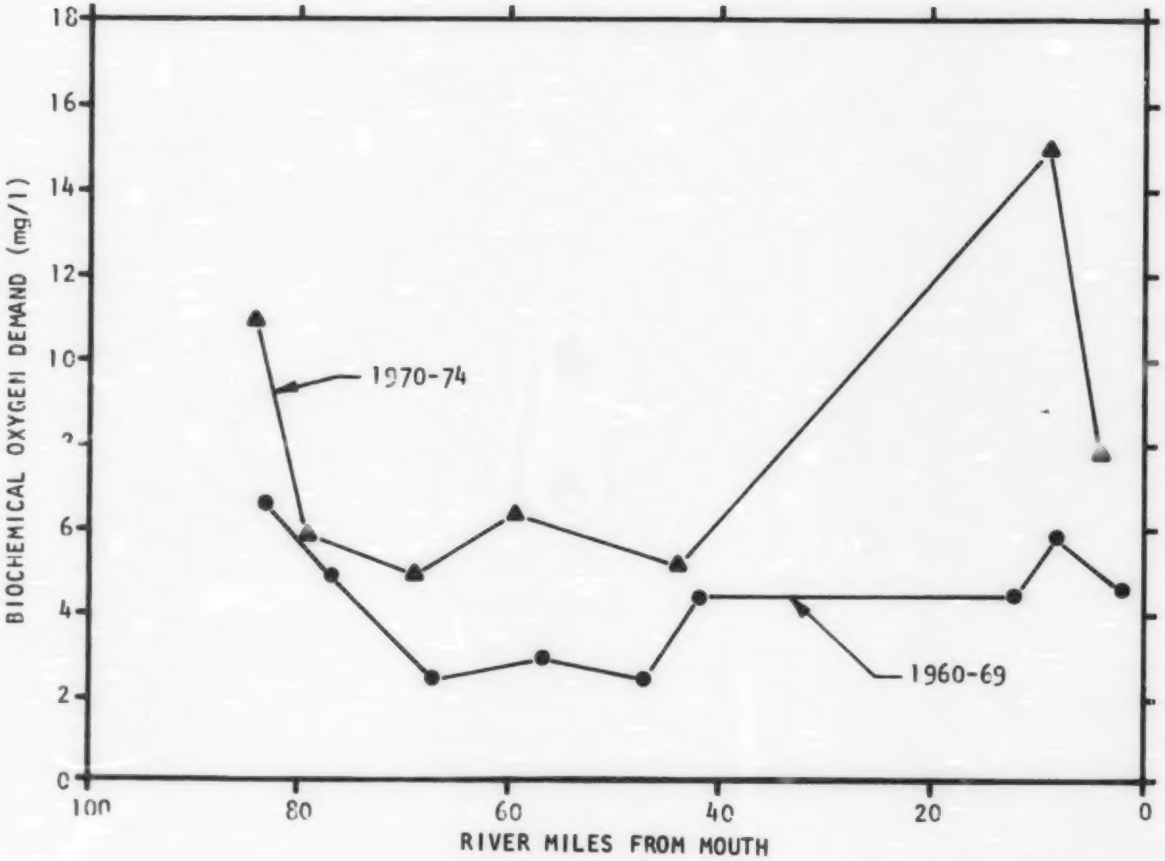


FIGURE IV-26 COMPARISON OF MEAN BIOCHEMICAL OXYGEN DEMAND IN THE SHELLROCK RIVER, 1960's vs 1970's

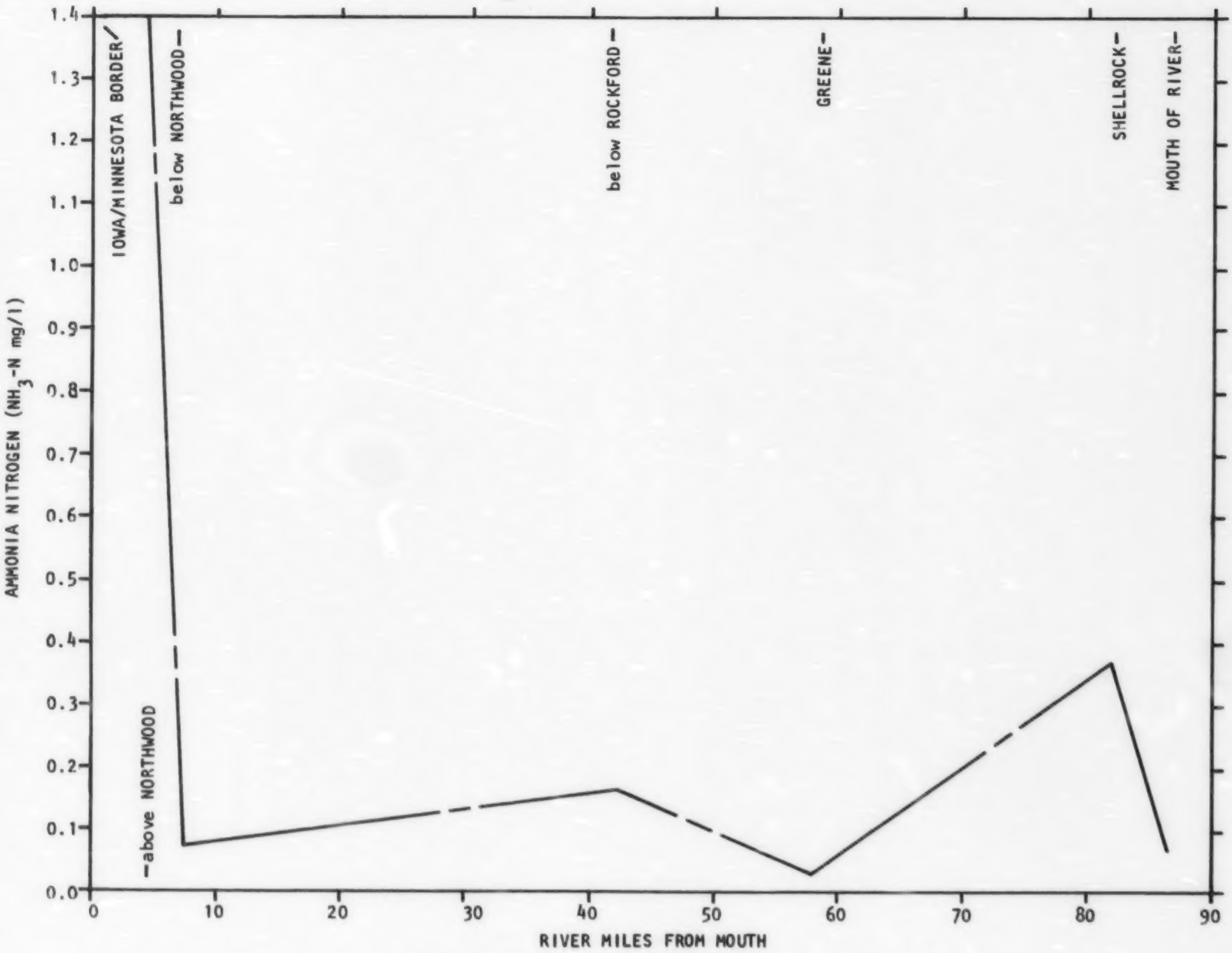


FIGURE IV-27 MEAN AMMONIA NITROGEN CONCENTRATIONS IN THE SHELLROCK RIVER, 1970-1974

Winnebago River, pollution in this area has decreased dramatically. Mason City now has advanced treatment for their wastes, and the American Beet Sugar Plant, which caused much of the pollution, is no longer in business.

Extensive sampling was also conducted in the 1950's. On the basis of those samples, ammonia concentrations have decreased, but BOD concentrations have increased slightly. Dissolved oxygen has also increased somewhat, but this may be due to algal blooms, high flows, and less intensive sampling in recent years rather than actual improvement. Data from 1960-1970 indicate that concentrations in the river have increased since the 1960's rather than decreased. The focus of pollution today appears to be on Albert Lea in Minnesota and on Iowa point sources. While much of the dissolved oxygen and ammonia problem is outside of Iowa, point sources on the Shellrock in Iowa also need increased waste treatment to eliminate pollution on the river. The Shellrock has the potential for being one of the best recreational rivers in the State, if pollution can be eliminated.

Health Hazards and Aesthetic Degradation - Fecal coliform concentrations in the Shellrock have been found to be highest below point sources, particularly below Northwood. Point sources seem to have a significant impact on the fecal coliform concentrations in the stream (Figure IV-28).

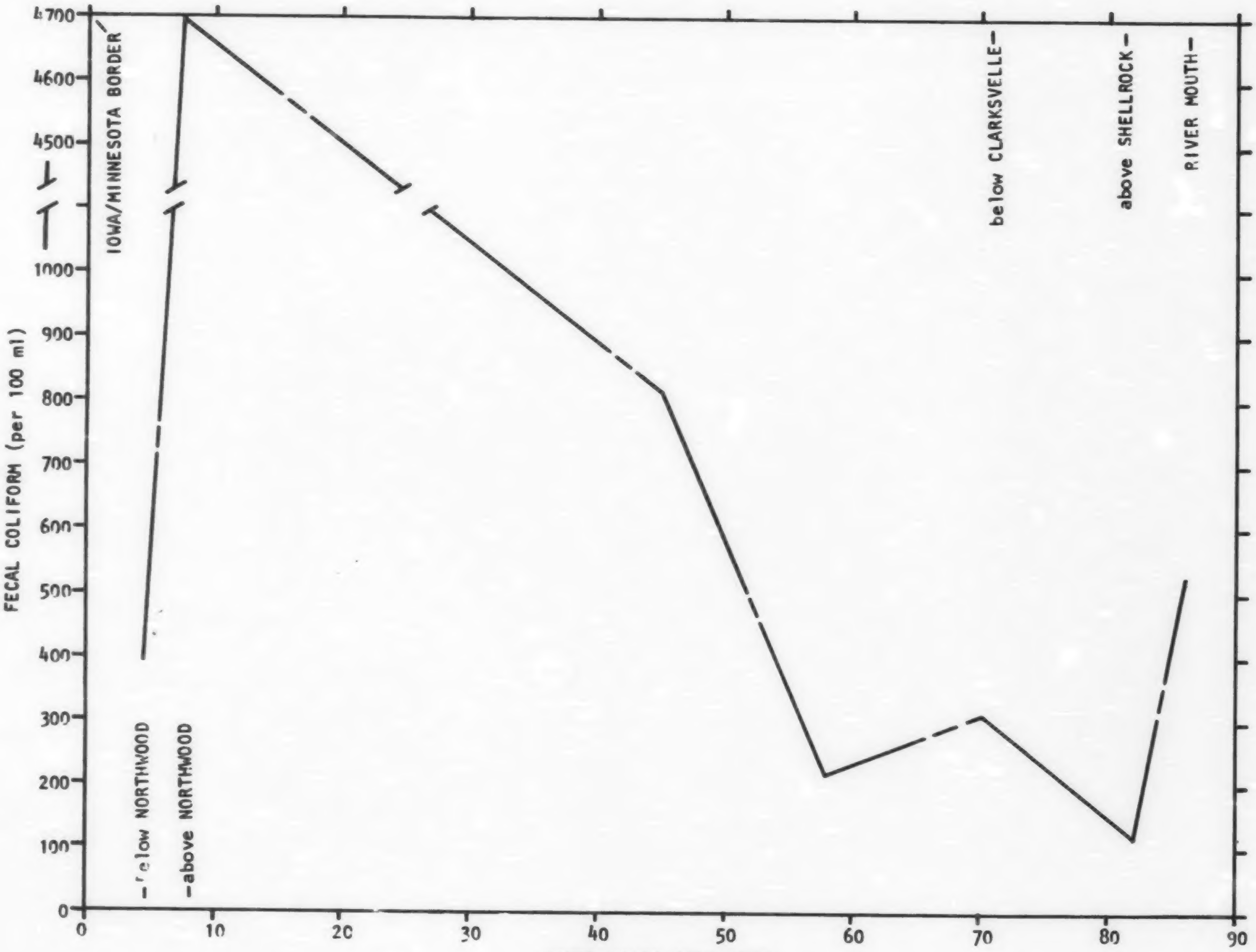


FIGURE IV-28 MEAN FECAL COLIFORM CONCENTRATIONS FOR THE SHELLROCK RIVER, 1970-1974

Aesthetic degradation, particularly concerning odor, is also a major problem. As mentioned above, serious odor problems occurred below the Winnebago River at Marble Rock and Greene in the late 1920's. Today the main odor problem is in the Northwood area where the Shellrock enters the State. Numerous complaints concerning aesthetic degradation have been received by the Department of Environmental Quality over the past several years. Interstate cooperation between Minnesota and Iowa is underway to eliminate the pollution problems in this part of the river. Upon completion of adequate treatment at point sources on the upper Shellrock, considerable improvement should be noted.

REFERENCES

1. A Chemical and Bacteriological Survey of the Iowa River, Report No. 70-27, State Hygienic Laboratory, February 19, 1970.

2. Investigation of Pollution of the Cedar River from Waverly to Columbus Junction, 1926-1931. State Department of Health (Iowa), Des Moines, Iowa, 1931. 90pp.

3. Investigation of Pollution of the Cedar River from Waverly to Columbus Junction, 1932-1935. State Department of Health (Iowa), Des Moines, Iowa, 1935. 65pp.

4. McDonald, Donald B. "Cedar River Baseline Ecological Study." (Duane Arnold Energy Center). Annual Report, 4/28/71 to 4/24/72, 1972.

5. McDonald, Donald B. "Coralville Reservoir Water Quality Study." Annual Report, Water Year 10/1/71 to 9/30/72, 1972. Report #74-2.

6. Report on the Investigation of Pollution of the Iowa River from Iowa Falls to Columbus Junction 1930-1935. State Department of Health (Iowa). Des Moines, Iowa, 1935. 74pp.

7. Water Quality Survey of the Shellrock River, Report No. 70-35, State Hygienic Laboratory, March 23, 1970.

8. Water Quality Survey of the Shellrock River, Report No. 73-19, State Hygienic Laboratory, Oct. 26, 1972.

9. Water Quality Survey of the Winnebago River from Mason City to the Shellrock River, Report No. 70-29, Feb. 26, 1970.

10. "Iowa Water Quality Report," Iowa Department of Environmental Quality, April, 1976.

CHAPTER V

POINT SOURCE DISCHARGE INVENTORY

Point sources of wastewater, identified in DEQ files as discharging to surface waters in the Iowa-Cedar River Basin, have been inventoried and tabulated. Municipal, industrial, and semipublic sources are included. Agricultural and some nonpoint sources are inventoried in Chapter VII.

An alphabetical listing of individual municipal, industrial, and semipublic wastewater discharges appears in Table V-1. Also included in this table is information concerning the location of each discharge (by county and river mile) and an identification of the receiving stream for each discharge.

A coding system is developed in Table V-1, which assigns a reference number to each discharge. Reference numbers for municipal sources are prefixed by "M", industrial sources by "I", and semipublic sources by "S", (all incorporated municipalities have been assigned reference numbers whether they have discharges or not). The reference numbers are used to identify specific discharges as shown in Figure V-1. An attempt has been made to assign reference numbers in a downstream order beginning at the headwaters of the Iowa River. (It should be noted that a consecutive sequence of reference numbers for the municipalities does not appear in Figure V-1, since all incorporated municipalities in the basin were assigned reference numbers, but only those with existing discharges are shown in the figure).

Table V-2 identifies characteristics of each point wastewater discharge from municipal, semipublic, and industrial sources. Discharges are listed in this table in a downstream order. The table begins at the northern end of the Iowa River Basin. For each tributary stream, the point source furthest upstream is identified and the tabulation continues downstream to the main channel.

Table V-2 lists design flow, present average daily flow, BOD_5 and ammonia nitrogen effluent concentrations and quantities, type of treatment processes, method of sludge disposal, and comments, for each discharger. Treatment processes are identified only in general terms. Specific process descriptions can be obtained from DEQ. The comments may include information obtained by DEQ personnel concerning existing operation, age of existing facilities, specific DEQ operation permit requirements, DEQ orders for additional treatment, a delineation of proposed facilities, or other pertinent comments.

A total of 140 municipal treatment facilities and 5 sanitary districts have been identified in the basin. In addition, 69 small communities presently without municipal collection and treatment systems are included in Tables V-1 and V-2.

MUNICIPAL

Municipal sewage flow and operational data were extracted from DEQ records and files. Average flow values contained in reports submitted by treatment plant operators have been used. Flow values shown in Table V-2 are the averages obtained for the last full year of record; in most instances 1974.

Most effluent quality data were collected from DEQ's Effluent Quality Analysis Program (EQAP). These data were supplemented by review of treatment facility operation reports. Data reported through EQAP are the results of tests conducted by the Iowa State Hygienic Laboratory on wastewater samples supplied by the individual dischargers. In most instances, no more than twelve BOD_5 values and less than two ammonia nitrogen values are reported each year. This is due to the fact that a significant portion of the facilities are lagoons that only discharge a few times each year. No samples are required when the facilities are not discharging.

The results of BOD_5 analyses performed by the Iowa State Hygienic Laboratory (reported in EQAP) are reported as being between 25 mg/l and 150 mg/l. For some communities, a large percentage of the values reported are 25 or "25-" mg/l. Values designated "25-" are less than 25 mg/l, but were assumed to be equal to 25 mg/l for this study. Thus, the actual average effluent BOD5 concentration may in some cases be lower than that obtained from EQAP information. The accuracy of the program will be reviewed since some dischargers are, or soon will be, required to provide BOD_5 effluent concentrations of less than 25 mg/l.

In some instances, due to a sparsity and scattering of data, engineering judgment was applied to arrive at more representative values rather than taking strict averages of the available data.

SEMIPUBLIC

Information identifying semipublic treatment facilities in the study area was obtained from DEQ files. Description of wastewater discharges from semipublic facilities was difficult due to the minimal surveillance provided. Quantitative and qualitative data was obtained from EQAP reports or design information in DEQ files. Values in Table V-2 are thus based on limited operational data and design characteristics and engineering judgment; and may not accurately reflect present operating conditions.

INDUSTRIAL

Information on industries discharging wastewater to streams within the basin was obtained from the U. S. Army Corps of Engineers discharge permit applications (Discharge Permit Program, Rivers and Harbors Act of 1899), DEQ industrial files, and the National Pollutant Discharge Elimination System (NPDES) permit applications. Although these sources provide the best available discharge information, caution should be exercised in its interpretation since it represents data that has been submitted by the individual industries with very little verification.

SUMMARY

The distribution of hydraulic and organic loads upon the streams in the Iowa-Cedar River Basin from municipal, industrial, and semipublic point sources, is summarized in Table V-3. Generally, the relatively small quantity of BOD_5 and ammonia-N discharged by industries and semipublic facilities compared to their flow may be attributed to the following:

1. Several quarries discharge large volumes of ground and surface water, but add very little BOD_5 or ammonia-N to the stream.
2. Several industrial discharges consist only of cooling water; which adds negligible amounts of BOD_5 or ammonia-N to the stream.
3. Insufficient monitoring data exists for many of the semipublic and industrial facilities to adequately detect actual quantities.

Table V-4 summarizes the various types of municipal wastewater treatment facilities, the number of communities served, and the population served, for each subbasin. Table V-5 is a composite of Table V-4 for the entire Iowa-Cedar River Basin.

None of the communities in the study area presently operate advanced type facilities. However, waste load allocations proposed in this plan will require several municipalities and industries to construct advanced wastewater treatment facilities.

TABLE V-1
POINT SOURCE
WASTEWATER DISCHARGES

Discharger[1]	Reference Number	County	River Mile[2]	Discharge to[3]	Page Reference Inventory Chapt. V-Pg.	Page Reference Needs Chapt. VIII-Pg.
MUNICIPAL						
Ackley	M-141	Hardin	37/169	Beaver Cr. to Cedar River	51	10
Ainsworth	M-207	Washington	--	NEMTF	70	20
Albion	M-27	Marshall	6/225	Chicago Cr. to Iowa River	25	14
Alburnett	M-187	Linn	25/76	Dry Cr. to Indian Cr. to Cedar River	65	11
Alden	M-10	Hardin	289	Iowa River	22	13
Alexander	M-107	Franklin	--	NEMTF	44	17
Allison	M-115	Butler	27/204	Feddeke Cr. to Cedar River	46	17
Amana S.D.	M-54	Iowa	--/120	Iowa River	31	12
Aplington	M-142	Butler	26/169	Beaver Cr. to Cedar River	52	8
Aredale	M-111	Butler	--	NEMTF	45	--
Atalissa	M-204	Muscatine	--	NEMTF	69	19
Atkins	M-177	Benton	7/84	Dry Cr. to Cedar River	61	11
Bassett	M-96	Chickasaw	--	NEMTF	42	--
Beaman	M-161	Grundy	--	NEMTF	57	18
Belle Plaine	M-43	Benton	--/160	Dry Cr. to Iowa River	29	12
Belmond	M-5	Wright	324	Iowa River	21	8
Bennett	M-197	Cedar	22/28	Bennett Cr. to Sugar Cr. to Cedar R.	68	18
Bertram	M-192	Linn	--	NEMTF	66	11
Blairstown	M-184	Benton	29/81	Prairie Cr. to Cedar River	63	20
Brandon	M-167	Buchanan	3/131	Lime Cr. to Cedar River	59	11
Bristow	M-112	Butler	--	NEMTF	45	17
Brooklyn	M-48	Poweshiek	26/140	Bear Cr. to Iowa	30	7
Buckeye	M-16	Hardin	--	NEMTF	24	--
Burlington	M-215	Des Moines	--	Mississippi River	72	9
Carpenter	M-85	Mitchell	--	NEMTF	41	--
Cedar Falls - Main Plant	M-147	Black Hawk	159	Cedar River	53	10
Cedar Falls - Cedar Hts. Plant	M-148	Black Hawk	157	Cedar River	53	10
Cedar Rapids - Main Plant	M-181	Linn	33	Cedar River	63	7
Cedar Rapids - Indian Cr. Plant	M-189	Linn	77	Cedar River	65	8
Center Point	M-174	Linn	3/106	Blue Cr. to Cedar River	60	10
Charles City	M-92	Floyd	222	Cedar River	42	7
Chelsea	M-38	Tama	--	NEMTF	29	13
Clarksville	M-139	Butler	23/174	Shell Rock R. to Cedar River	51	10
Clear Lake S.D.	M-133	Cerro Gordo	28/174	Beaverdam Cr. to W. Fk. Cedar R. to Cedar River	44	8
Clemons	M-26	Marshall	9/231	Minerva Cr. to Iowa River	25	14
Clutier	M-39	Tama	17/160	Salt Cr. to Iowa River	29	13
Columbus City	M-208	Louisa	--	NEMTF	70	20
Columbus Jct.	M-84	Louisa	26	Iowa River	40	15
Colwell	M-95	Floyd	--	NEMTF	42	--
Conesville	M-82	Muscatine	4/11	Honey Cr. to Iowa River	40	15

TABLE V-1
POINT SOURCE
WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference	
					Inventory	Needs
					Chapt. V-Pg.	Chapt. VIII-Pg
Conrad	M-160	Grundy	50/139	Wolf Cr. to Cedar River	57	9
Coralville	M-64	Johnson	2/85	Iowa River	36	14
Cotter	M-83	Louisa	--	NEMTF	40	--
Coulter	M-113	Franklin	--	NEMTF	45	17
Crystal Lake	M-1	Hancock	--	NEMTF	21	14
Deep River	M-71	Poweshiek	--	NEMTF	38	18
Denver	M-99	Bremer	19/183	Quarter Section Rise to Cedar River	43	16
Dike	M-153	Grundy	25/159	Black Hawk Cr. to Cedar River	54	16
Dougherty	M-137	Cerro Gordo	--	NEMTF	51	--
Dows	M-8	Wright	304	Iowa River	22	8
Dumont	M-106	Butler	35/174	W. Fk. Cedar to Cedar River	44	17
Durant	M-200	Cedar	15/28	Mud Cr. to Cedar River	68	16
Dysart	M-40	Tama	22/60	E. Branch Salt Cr. to Iowa River	29	12
Elberon	M-41	Tama	--	NEMTF	29	13
Eldora	M-13	Hardin	253	Iowa River	23	13
Eldora Reformatory	M-14	Hardin	9/247	Beaver Cr. to Iowa River	23	14
Elk Run Hts.	M-157	Black Hawk	--/150	Elk Run to Cedar River	56	11
Ely	M-57	Linn	5/104	Hoosier Cr. to Iowa River	32	12
Evansdale	M-156	Black Hawk	151	Cedar River	56	11
Fairfax	M-185	Linn	9/81	Prairie Cr. to Cedar River	64	19
Ferguson	M-32	Marshall	--	NEMTF	27	13
Fertile	M-129	Worth	--	NEMTF	48	16
Floyd	M-91	Floyd	232	Cedar River	42	16
Forest City - E	M-126	Winnebago	147/184	Winnebago River to Shell Rock to Cedar River	47	8
Forest City - SW	M-127	Winnebago	148/184	Trib. to Winnebago R. to Shell Rock to Cedar River	48	9
Fredonia	M-206	Louisa	--	NEMTF	70	20
Galt	M-7	Wright	--	NEMTF	22	--
Garner	M-2	Hancock	349	E. Branch Iowa River	21	13
Garrison	M-170	Benton	7/119	Hinkle Cr. to Cedar River	59	11
Garwin	M-35	Tama	12/189	Deer Cr. to Iowa River	28	12
Geneva	M-114	Franklin	--	NEMTF	45	17
Gibson	M-75	Keokuk	--	NEMTF	39	--
Gilbertville	M-159	Black Hawk	--	NEMTF	57	11
Gilman	M-31	Marshall	18/216	Brush Cr. to Iowa River	27	12
Gladbrook	M-162	Tama	40/139	Wolf Cr. to Cedar River	57	17
Goodell	M-4	Hancock		NEMTF	21	14
Grafton	M-90	Worth	--	NEMTF	41	16
Grandview	M-210	Louisa	--	NEMTF	70	20
Greene	M-136	Butler	39/174	Shell Rock to Cedar River	51	8
Grinnell	M-46	Poweshiek	--	Trib. to Skunk River	30	--
Grundy Center	M-150	Grundy	30/159	Black Hawk Cr. to Cedar River	54	7
Guernsey	M-70	Poweshiek	--	NEMTF	38	--
Hampton	M-110	Franklin	67/174	Squaw Cr. to Cedar River	45	9
Hanlontown	M-131	Worth	--	NEMTF	48	16
Hansell	M-109	Franklin	--	NEMTF	45	--

TABLE V-1
POINT SOURCE
WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference	
					Inventory Chapt. V-Pg.	Needs Chapt VIII-Pg.
Hartwick	M-45	Poweshiek	--	NEMTF	29	--
Haverhill	M-30	Marshall	--	NEMTF	27	13
Hiawatha	M-180	Linn	--	NEMTF (to Cedar Rapids STP)	62	--
Hills	M-66	Johnson	78	Iowa River	37	15
Holland	M-149	Grundy	35/159	Black Hawk Cr. to Cedar River	54	18
Homestead S.D.	M-53	Iowa	--/120	Iowa River	31	12
Hubbard	M-22	Hardin	23/232	Honey Cr. to Iowa River	25	10
Hudson	M-154	Black Hawk	11/159	Black Hawk Cr. to Cedar River	55	7
Iowa City Westinghouse	M-60	Johnson	3/87	Rapid Cr. to Iowa River	34	15
Iowa City Main Plant	M-65	Johnson	82	Iowa River	36	14
Iowa Falls	M-11	Hardin	282	Iowa River	23	8
Janesville	M-100	Bremer	176	Cedar River	43	8
Jesup	M-166	Buchanan	15/135	Spring Cr. to Cedar River	58	8
Joice	M-130	Worth	--	NEMTF	48	16
Kalona	M-80	Washington	15/44	English River to Iowa River	40	18
Kensett	M-117	Worth	--	NEMTF	46	19
Keswick	M-76	Keokuk	--	NEMTF	39	18
Keystone	M-182	Benton	41/81	Prairie Cr. to Cedar River	63	20
Kinross	M-78	Keokuk	--	NEMTF	39	--
Klemme	M-3	Hancock	340	E. Branch Iowa River	21	14
Ladora	M-50	Iowa	9/143	Bear Cr. to Iowa River	30	20
Lake Mills	M-128	Winnebago	111/174	Beaver Cr. to Shell Rock to Cedar R.	48	7
LaPorte City	M-165	Black Hawk	1/139	Wolf Cr. to Cedar River	58	10
Latimer	M-108	Franklin	--	NEMTF	45	17
LeGrand	M-33	Marshall	2/212	Trib. to Iowa River	28	12
Leland	M-125	Winnebago	154/184	Winnebago River to Shell Rock River	47	16
Letts	M-209	Louisa	--	NEMTF	70	20
Lincoln	M-163	Tama	--	NEMTF	58	--
Lisbon	M-193	Linn	5/65	Spring Cr. to Cedar River	66	19
Liscomb	M-20	Marshall	237	Iowa River	24	14
Lone Tree #1	M-68	Johnson	7/72	Drainage Ditch to Iowa River	38	15
Lone Tree #2	M-69	Johnson	9/67	Unnamed Trib. to Iowa River	38	15
Luzerne	M-44	Benton	--	NEMTF	29	--
Malcom	M-47	Poweshiek	33/140	Little Bear Cr. to Iowa River	30	21
Manly	M-118	Worth	85/174	Rose Cr. to Shell Rock to Cedar R.	46	19
Marble Rock	M-135	Floyd	45/174	Shell Rock to Cedar River	50	20
Marion	M-188	Linn	--	NEMTF (to Cedar Rapids STP)	65	--
Marshalltown	M-28	Marshall	222	Iowa River	26	8
Marengo	M-51	Iowa	140	Iowa River	31	11
Martelle	M-191	Jones	--	NEMTF	66	12
Mason City	M-134	Cerro Gordo	79/174	Winnebago River to Shell Rock to Cedar River	50	8
Mediapolis	M-214	Des Moines	10	Hawkeye Cr. to Mississippi River	71	15
Meservey	M-104	Cerro Gordo	--	NEMTF	44	17
Middle Amana S.D.	V-11	Iowa	--/129	Iowa River	31	13
Millersburg	M-72	Iowa	--	NEMTF	39	18
Mitchell	M-87	Mitchell	--	NEMTF	41	16

TABLE V-1
POINT SOURCE
WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference	
					Inventory	Needs
					Chapt. V-Pg.	Chapt. VIII-Pg.
Montour	M-34	Tama	198	Iowa River	28	13
Morning Sun	M-212	Louisa	8/8	Otter Cr. to Iowa River	71	19
Morrison	M-151	Grundy	--	NEMTF	54	--
Mt. Auburn	M-168	Benton	3/139	Spring Cr. to Cedar River	59	11
Mt. Vernon	M-194	Linn	4/65	Spring Cr. to Cedar River	66	18
Nashua	M-93	Chickasaw	210	Cedar River	42	7
Newhall	M-176	Benton	14/96	Little Bear Cr. to Cedar River	61	11
New Hartford	M-146	Butler	9/69	Beaver Cr. to Cedar River	52	18
New Providence	M-23	Hardin	--	NEMTF	25	14
Nichols	M-205	Muscatine	5/14	Big Slough to Wapsinonoc to Cedar R.	70	19
Nora Springs	M-121	Floyd	68/174	Shell Rock to Cedar River	47	19
North English	M-73	Iowa	30/44	Middle English River to Iowa River	39	7
North Liberty	M-61	Johnson	1/92	Muddy Cr. to Iowa River	34	15
Northwood	M-116	Worth	103/174	Shell Rock River to Cedar River	46	19
Norway	M-185	Benton	18/81	Prairie Cr. to Cedar River	64	20
Oakville	M-213	Louisa	--	NEMTF	71	20
Orchard	M-89	Mitchell	3/240	Spring Cr. to Cedar River	41	16
Osage	M-88	Mitchell	1/247	Sugar Cr. to Cedar River	41	16
Owasa	M-17	Hardin	--	NEMTF	24	--
Oxford	M-62	Johnson	12/85	Clear Cr. to Iowa River	35	15
Palo	M-178	Linn	1/84	Dry Cr. to Cedar River	61	9
Parkersburg	M-144	Butler	21/169	Beaver Cr. to Cedar River	52	10
Parnell	M-74	Iowa	--	NEMTF	39	--
Plainfield	M-97	Bremer	200	Cedar River	43	10
Plymouth	M-119	Cerro Gordo	--	NEMTF	47	--
Popejoy	M-9	Franklin	--	NEMTF	22	--
Raddcliffe	M-21	Hardin	24/233	Honey Cr. to Iowa River	25	14
Raymond	M-158	Black Hawk	--	NEMTF	57	12
Reinbeck	M-152	Grundy	21/159	Black Hawk Cr. to Cedar River	54	7
Riverside	M-81	Washington	4/144	N. English River to Iowa River	40	10
Robins	M-179	Linn	--	NEMTF	61	12
Rock Falls	M-120	Cerro Gordo	--	NEMTF	47	--
Rockford	M-122	Floyd	59/174	Shell Rock to Cedar River	47	19
Rockwell	M-102	Cerro Gordo	61/174	W. Fk. River to Cedar River	44	9
Rowan	M-6	Wright	--	NEMTF	22	14
Rudd	M-138	Floyd	--	NEMTF	51	19
St. Ansgar	M-86	Mitchell	258	Cedar River	41	15
St. Anthony	M-25	Marshall	--	NEMTF	25	14
Scarville	M-123	Winnebago	--	NEMTF	47	--
Sheffield	M-105	Franklin	56/174	W. Fk. Cedar To Cedar River	44	10
Shell Rock	M-140	Butler	11/174	Shell Rock to Cedar River	51	10
Shellsburg	M-175	Benton	13/96	Bear Cr. to Cedar River	61	9
Shueyville	M-58	Johnson	--	NEMTF	32	13
Solon	M-59	Johnson	5/87	Mill Cr. to Lake McBride to Iowa R.	33	12

TABLE V-1
POINT SOURCE
WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	Page Reference Needs Chapt. VIII-Pg.
South English	M-77	Keokuk	--	NEMTF	39	18
Springville	M-190	Linn	14/73	Big Cr. to Cedar River	65	8
Stacyville	M-94	Mitchell	59/209	Little Cedar To Cedar River	42	16
Stanwood	M-195	Cedar	25/41	Rock Cr. to Cedar River	67	19
State Center	M-29	Marshall	21/220	N. Timber Cr. to Iowa River	27	12
Steamboat Rock	M-12	Hardin	259	Iowa River	23	14
Stockton	M-199	Muscatine	18/38	Mud Creek to Cedar River	68	19
Stout	M-145	Grundy	--	NEMTF	52	18
Swaledale	M-101	Cerro Gordo	--	NEMTF	44	17
Swisher	M-56	Johnson	2/104	Swisher Cr. to Iowa River	32	12
Tama	M-37	Tama	188	Iowa River	29	8
Thompson	M-124	Winnebago	--	NEMTF	47	16
Thornton	M-103	Cerro Gordo	68/174	Bailey Cr. to W. Fk. Cedar to Cedar R.	44	17
Tiffin	M-63	Johnson	9/85	Clear Cr. to Iowa River	35	15
Tipton	M-196	Cedar	14/38	Sugar Creek to Cedar River	67	18
Toledo	M-36	Tama	4/189	Deer Creek to Iowa River	28	12
Traer	M-164	Tama	25/139	Wolf Creek to Iowa River	58	8
Union	M-18	Hardin	242	Iowa River	24	14
University Heights	M-169	Johnson	82	To Iowa City STP	36	14
Urbana	M-172	Benton	3/106	Blue Cr. to Cedar River	60	11
Van Horne	M-183	Benton	44/81	Prairie Cr. to Cedar River	63	9
Ventura	M-132	Cerro Gordo	--	NEMTF	49	--
Victor	M-49	Iowa	12/140	Bear Creek to Iowa River	30	9
Vining	M-42	Tama	--	NEMTF	29	--
Vinton	M-171	Benton	119	Cedar River	59	7
Walcott	M-198	Scott	22/28	Mud Creek to Cedar River	68	19
Walford	M-55	Benton	--	NEMTF	32	13
Walker	M-173	Linn	10/106	Blue Creek to Cedar River	60	11
Wapello	M-211	Louisa	17	Iowa River	70	20
Waterloo	M-155	Black Hawk	158	Cedar River	56	7
Waverly	M-98	Bremer	186	Cedar River	43	13
Wellman	M-79	Washington	26/44	N. English River to Iowa River	39	9
Wellsburg	M-143	Grundy	39/169	S. Fk. Beaver Cr. to Beaver Cr. to Cedar River	52	18
West Branch	M-203	Cedar	22/15	Wapsinonoc Creek to Cedar River	69	19
West Burlington	M-216	Des Moines	--	Spring Cr. to Mississippi River	73	15
West Liberty	M-202	Muscatine	10/15	Wapsinonoc Creek to Cedar River	69	18
Whitten	M-19	Hardin	--	NEMTF	24	--
Williams	M-15	Hardin	34/247	Tipton Cr. to S. Fk. Iowa to Iowa R.	24	10
Williamsburg	M-67	Iowa	28/73	Old Man Creek to Iowa River	38	7
Wilton	M-201	Muscatine	7/28	Mud Creek to Cedar River	69	16
Zearing	M-24	Story	14/231	Middle Minerva Cr. to Iowa River	25	14

TABLE V-1
POINT SOURCE
WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	 Needs Chapt. VIII-Pg.
SEMIPUBLIC						
Amana - Nordstrom Holiday Inn	S-38	Iowa	34/85	Clear Cr. to Iowa River	34	
AMOCO Oil Company, Victor	S-19	Iowa	13/143	Little Bear Cr. to Bear Cr. to Iowa R.	31	
AMOCO Oil Company, Williamsburg	S-60	Iowa	37/76	Old Mans Cr. to Iowa River	38	
Aplington WTP	S-80	Butler	26/169	Beaver Cr. to Cedar River	51	
Beeds Lake State Park	S-72	Franklin	52/174	Spring Cr. to W. Fk. Cedar to Cedar River	45	
Belmond WTP	S-2	Wright	324	Iowa River	22	
Benton County Home	S-97	Benton	1/119	Trib. to Cedar River	60	
Black Hawk County Home	S-84	Black Hawk	--	N/A	53	
Blairstown WTP	S-103	Benton	29/81	Prairie Cr. to Cedar River	63	
Brannian Service Station	S-[illegible]3	Poweshiek	59/40	Dry Run Cr. to English River	38	
Brooklyn WTP	S-17	Poweshiek	26/140	Bear Cr. to Iowa River	30	
Burlington WTP	S-127	Des Moines	--	Flint Cr. to Mississippi	72	
Carlton M.H.P.	S-107	Linn	13/73	Big Cr. to Cedar River	66	
Cambridge Estates M.H.P.	S-13	Marshall	4/216	Timber Cr. to Iowa River	28	
Cedar County Home	S-109	Cedar	19/38	Trib. to Cedar River	67	
Cedar Falls Mobile Home Village	S-82	Black Hawk	8/161	Small Cr. to Cedar River	53	
Cedar Knoll M.H.P.	S-87	Black Hawk	3/154	Trib. to Cedar River	56	
Cedar Lake M.H.P.	S-111	Cedar	--	N/A	67	
Cedar Rapids WTP	S-102	Linn	87	Cedar River	62	
Cedar River Camping	S-113	Cedar	41	Cedar River	67	
Charles City WTP	S-69	Floyd	223	Cedar River	42	
College Community School	S-23	Linn	6/100	Hoosier Cr. to Iowa River	32	
Colony Enterprises	S-37	Iowa	35/85	Trib. to Clear Cr. to Iowa River	34	
Cono Christian School	S-44	Buchanan	--/106	Blue Cr. to Cedar River	60	
Conoco Stations	S-56	Iowa	48/76	Old Mans Cr. to Iowa River	37	
Coral Marina Recreation	S-30	Johnson	1/89	Turkey Cr. to Iowa River	33	
Coralville WTP	S-34	Johnson	1/86	Unnamed Trib. to Iowa River	34	
Cottage Reserve Corp.	S-29	Johnson	89	Iowa River	33	
Country Side Court	S-77	Winnebago	144/184	Trib. to Winnebago River	48	
Des Moines County Home	S-125	Des Moines	--	Flint Cr. to Mississippi River	71	
Dickey's Prairie Home No. 2	S-16	Poweshiek	33/140	Bear Cr. to Iowa River	30	
Dietrick M.H.P.	S-86	Grundy	--	N/A	54	
Echo Valley M.H.P.	S-124	Des Moines	--	Flint Cr. to Mississippi River	71	
Edrich Addition	S-8	Hardin	15/232	Honey Cr. to Iowa River	25	
Elk Run School	S-89	Black Hawk	2/153	Elk Run to Cedar River	56	

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POINT SOURCE
WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	Page Reference Needs Chapt. VIII-Pg.
Far Horizons	S-53	Johnson	7/82	Snyder Creek	37	
Forest City WTP	S-75	Winnebago	149/184	Winnebago R. to Shell Rock to Cedar R.	47	
Gladbrook WTP	S-90	Tama	41/139	Wolf Cr. to Cedar River	57	
Glen Oaks 1st Add.	S-101	Linn	93	Cedar River	62	
Green Acres M.H.P.	S-126	Des Moines	--	Dry Branch Cr. to Mississippi River	72	
Green Acres M.H.P.	S-67	Washington	16/44	English R. to Iowa River	40	
Grundy Center WTP	S-85	Grundy	31/159	Black Hawk Cr. to Cedar River	54	
Hancock County Home	S-1	Hancock	--	Trib. to Iowa River	21	
Hardin County Home	S-5	Hardin	8/249	Beaver Cr. to S. Fk. Iowa to Iowa R.	24	
Hickory Hills Homes of Tama County	S-91	Tama	16/139	Wolf Cr. to Cedar River	58	
Hickory Hills Park - Black Hawk C.C.B.	S-92	Tama	16/139	Wolf Cr. to Cedar River	58	
Highlander Supper Club	S-33	Johnson	3/83	Rapid Cr. to Iowa River	33	
Highway No. 3 M.H.P.	S-7	Bremer	--	N/A	43	
Holiday Inn	S-48	Johnson	3/85	Trib. to Clear Cr. to Iowa River	36	
Home Oil Company	S-110	Cedar	3/138	Trib. to Cedar River	67	
Hubbard School	S-7	Hardin	23/233	Honey Cr. to Iowa River	25	
I-80 Wheel	S-114	Cedar	7/28	Cedar River	68	
Indian Lookout M.H.P.	S-52	Johnson	2/78	Trib. to Iowa River	37	
IO-DIS-E-CA Lutheran Church Camp	S-26	Johnson	105	Iowa River	32	
Iowa City WTP	S-50	Johnson	83	Iowa River	36	
Iowa County Home	S-57	Iowa	48/76	Old Mans Cr. to Iowa River	37	
Iowa Highway Comm. Rest Areas:						
I-35(Clear Lk.) E. Side	S-78	Cerro Gordo	94/174	Trib. to Winnebago R. to Shell Rock River to Cedar River	49	
I-35(Clear Lk.) W. Side	S-79	Cerro Gordo	95/174	Trib. to Winnebago R. to Shell Rock River to Cedar River	49	
I-380(Swisher) E. Side	S-25	Linn	7/108	Trib. to Iowa River	32	
I-380(Swisher) W. Side	S-24	Linn	7/108	Trib. to Iowa River	32	
I-80(Tiffin) North Side	S-45	Johnson	8/85	Clear Creek to Iowa River	35	
I-80(Tiffin) South Side	S-44	Johnson	8/85	Clear Creek to Iowa River	35	
I-80(Victor) North Side	S-21	Iowa	11/140	Little Bear Cr. to Bear Cr. to Iowa R.	31	
I-80(Victor) South Side	S-64	Iowa	63/144	Devils Run to North English River to English River to Iowa River	39	
I-80(Wilton) North Side	S-115	Cedar	10/28	Sugar Cr. to Cedar River	68	
I-80(Wilton) South Side	S-116	Cedar	10/28	Sugar Cr. to Cedar River	68	
John Haas Housing Development	S-68	Floyd	2/230	Trib. to Cedar River	42	
Johnson County Home	S-49	Johnson	3/85	Clear Cr. to Iowa River	36	
Kampgrounds of Iowa	S-119	Cedar	20/15	E. Branch Wapsinonoc Cr. to Cedar R.	69	

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Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	Page Reference Needs Chapt. VIII-Pg.
Kirkwood Community College	S-105	Linn	--	Cedar Rapids S.T.P.	64	
Lake McBride State Park	S-27	Johnson	1/100	Iowa River	33	
Lakewood Hills	S-32	Johnson	3/86	Muddy Cr. to Iowa River	34	
Lake View Knolls	S-29	Johnson	1/89	Turkey Cr. to Iowa River	33	
Landmark Phillips 66	S-58	Iowa	30/76	Old Mans Cr. to Iowa River	37	
LaPorte City WTP	S-93	Black Hawk	1/139	Wolf Cr. to Cedar River	58	
Latimer WTP	S-71	Franklin	62/174	Spring Cr. to Maynes Cr. to W.Fk. Cedar	45	
Lincoln Terrace Estates M.H.P.	S-12	Marshall	3/216	Timber Cr. to Iowa River	27	
Lincoln Way Village	S-104	Linn	7/81	Prairie Cr. to Cedar River	64	
Linn County Home	S-106	Linn	16/77	Indian Cr. to Cedar River	65	
Lone Tree WTP	S-62	Johnson	8/72	Trib. to Iowa River	38	
Louisa County Home	S-123	Louisa	4/19	Trib. to Iowa River	70	
Marshall County Home	S-11	Marshall	14/220	Linn Cr. to Iowa River	26	
Middle America	S-59	Iowa	30/76	Old Mans Cr. to Iowa River	37	
Mobil Oil I-80	S-42	Johnson	13/85	Trib. to Clear Creek to Iowa River	35	
Newhall WTP	S-99	Benton	14/96	Little Bear Cr. to Bear Cr. to Cedar River	61	
Nickerson Farms	S-40	Iowa	34/85	Clear Cr. to Iowa River	35	
North English WTP	S-65	Iowa	31/44	Middle English River to English River to Iowa River	39	
Oak Grove M.H.P.	S-94	Black Hawk	1/139	Trib. to Cedar River	58	
Parkview M.H.P.	S-43	Johnson	11/85	Clear Cr. tc Iowa River	35	
Pilot Knob State Park	S-77	Hancock	146/184	Trib. to Winnebago R. to Shell Rock To Cedar River	48	
Pine Lake State Park	S-3	Hardin	--/254	Trib. to Iowa River	23	
Plantation Village M.H.P.	S-130	Des Moines	--	N/A	73	
Prairie View Acres M.H.P.	S-89	Black Hawk	--	N/A	56	
Quakerdale Home	S-4	Hardin	5/248	South Fork Iowa River to Iowa River	24	
Raddcliffe WTP	S-6	Hardin	24/233	Honey Cr. to Iowa River	24	
Ramada Inn	S-47	Johnson	4/85	Trib. to Clear Cr. to Iowa River	36	
Reorganized Latter Day Saints Church Camp	S-108	Cedar	19/45	Rock Cr. to Cedar River	67	
Rollin Homes Country Manor Phase II	S-100	Benton	8/96	Little Bear Cr. to Bear Cr. to Cedar River	61	
Safari-Inn Campground	S-41	Johnson	14/85	Clear Cr. to Iowa River	35	
Shellsburg WTP	S-98	Benton	14/96	Bear Cr. to Cedar River	60	
Skelly Oil Company	S-117	Cedar	10/28	Otter Cr. to Sugar Cr. to Cear River	68	
Skelly Station	S-39	Iowa	25/85	Trib. to Clear Cr. to Iowa River	34	
South Tama School Dist.	S-14	Tama	2/195	Raven Cr. to Iowa River	28	
Spring Grove M.H.P.	S-129	Des Moines	--	N/A	72	
Spring Lake Campground	S-131	Des Moines	--	Spring Cr. to Mississippi River	73	

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Discharger	Reference Number	County	River Mile	Discharge to	Page Reference	
					Inventory Chapt. V-Pg.	Needs Chapt. VIII-Pg.
Starlight M.H.P.	S-55	Johnson	3/81	Snyder Cr. to Iowa River	37	
State Center WTP	S-10	Marshall	21/220	Linn Cr. to Iowa River	26	
Stuckey Campark	S-112	Cedar	1/41	Trib. to Cedar River	67	
Stuelke M.H.P.	S-121	Cedar	20/15	Trib. to Wapsinonoc Cr. to Cedar R.	69	
Sudbury Court Motel	S-22	Iowa	--	N/A	31	
Sunrise Village M.H.P.	S-54	Johnson	7/81	Snyder Cr. to Iowa River	37	
Tama County Home	S-15	Tama	5/189	Deer Cr. to Iowa River	28	
Terrace Hill Sanitary Dist.	S-73	Franklin	60/174	Otter Cr. to Maynes Cr. to W. Fk. Cedar River	45	
Texaco - Coralville	S-36	Johnson	86	Iowa River	34	
Texaco - Burlingon	S-128	Des Moines	--	Mississippi River	72	
Texaco Star Inn	S-20	Iowa	13/143	Little Bear Cr. to Bear Cr. to Iowa River	31	
Texaco - Tiffin	S-46	Johnson	8/85	Clear Cr. to Iowa River	35	
Timber Trails Estate	S-31	Johnson	4/87	Sanders Cr. to Iowa River	33	
University of Iowa (Phys. Plant)	S-51	Johnson	87	Iowa River	36	
University of Northern Iowa (Plant Services)	S-83	Black Hawk	8/161	Dry Run Cr. to Cedar River	53	
Victor WTP	S-18	Iowa	12/140	Bear Cr. to Iowa River	30	
Vinton WTP	S-95	Benton	119	Cedar River	59	
Wellman WTP	S-67	Washington	26/44	Smith Cr. to English R. to Iowa River	39	
Western Hills M.H.P.	S-35	Johnson	2/85	Trib. to Clear Cr. to Iowa River	34	
West Hills Housing Development	S-81	Black Hawk	2/169	Beaver Cr. to Cedar River	52	
West Liberty WTP	S-122	Muscatine	10/15	Wapsinonoc Cr. to Cedar River	69	
Whittington Addition	S-120	Muscatine	9/15	Wapsinonoc Cr. to Cedar River	69	
Williamsburg WTP	S-61	Iowa	28/71	Old Mans Cr. to Iowa River	38	
Wilton WTP	S-118	Muscatine	7/28	Mud Cr. to Sugar Cr. to Cedar River	69	
Winnebago County Home	S-74	Winnebago	152/184	Beaver Cr. to Winnebago River to Shell Rock	47	
Zearing WTP	S-9	Story	16/231	Middle Minerva Cr. to Iowa River	25	
INDUSTRIAL						
Ackley Food Processors	I-76	Hardin	38/169	Beaver Cr. to Cedar River	51	
Allied Mills	I-66	Cerro Gordo	81/174	Winnebago River to Shell Rock to Cedar River	50	
Allied Mills	I-35	Johnson	3/85	Clear Cr. to Iowa River	36	
Amana Refrigeration	I-29	Iowa	125	Iowa River	31	
Amana Woolen Mills	I-30	Iowa	123	Iowa River	31	
American Oil Co.	I-153	Des Moines	--	Mississippi River	72	
Armour & Company	I-65	Cerro Gordo	83/174	Winnebago River to Shell Rock to Cedar River	49	
B.L. Anderson - Ballheim Quarry	I-100	Benton	9/139	Wolf Cr. to Cedar River	58	
B.L. Anderson - Jabens Quarry	I-102	Benton	6/125	Pratt Cr. to Cedar River	59	

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WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference	
					Inventory Chapt. V-Pg.	Needs Chapt. VIII-Pg.
B. L. Anderson - Garrison Quarry	I-103	Benton	7/119	Hinkle Cr. to Cedar River	59	
B.L. Anderson - Miller Quarry	I-104	Benton	1/118	Mud Cr. to Cedar River	60	
B.L. Anderson - Long Quarry	I-106	Benton	13/96	Bear Cr. to Cedar River	61	
B.L. Anderson - Alice Quarry	I-107	Linn	14.6/92	W. Otter Cr. to Otter Cr. to Cedar R.	61	
Buck Hummer Trucking	I-34	Johnson	16/85	Clear Cr. to Iowa River	35	
Burlington Northern - West Burlington	I-147	Des Moines	--	Flint Cr. to Mississippi River	71	
Cargill - 6th St. Plant	I-113	Linn	86	Cedar River	62	
Cargill - 10th Ave. Plant	I-117	Linn	85	Cedar River	63	
Cargill - 16th St. Plant	I-120	Linn	83	Cedar River	63	
Carnation Company	I-49	Bremer	186	Cedar River	43	
Cedar Falls Utilities	I-78	Black Hawk	--/170	Dry Run Cr. to Cedar River	52	
Central Iowa Rendering	I-21	Marshall	223	Iowa River	27	
Central Soya	I-4	Wright	324	Iowa River	22	
Chamberlain Mfg.	I-90	Black Hawk	8/163	Virden Cr. to Cedar River	55	
Cherry Burrell	I-125	Linn	4/81	Prairie Cr. to Cedar River	64	
Chicago, Milwaukee, St. Paul & Pacific R.R.	I-70	Cerro Gordo	79/174	Winnebago River to Shell Rock to Cedar River	50	
Chicago Northwestern R.R.-Beverly Station	I-122	Linn	5/81	Prairie Cr. to Cedar River	64	
Chicago-Rock Island & Pacific R.R.	I-114	Linn	86	Cedar River	62	
Chicago-Rock Island & Pacific R.R. - Manly	I-57	Worth	85/174	Rose Creek to Shell Rock to Cedar R.	46	
Clay Equipment Corp.	I-77	Black Hawk	157	Cedar River	52	
Collins Radio Group - "C" Avenue	I-109	Linn	--/77	Indian Cr. to Cedar River	62	
Collins Radio Group - 35th Street	I-111	Linn	--/87	Kenwood Ditch to Cedar River	62	
Construction Machinery Company	I-92	Black Hawk	160	Cedar River	55	
Culligan Water Conditioning	I-13	Marshall	1/225	Storm Sewer to Iowa River	26	
Culligan Water Conditioning	I-37	Johnson	--/82	Ralston Cr. to Iowa River	36	
Culligan Water Conditioning	I-132	Linn	12/77	Indian Cr. to Cedar River	65	
C.W. Shirey Company	I-89	Black Hawk	163	Cedar River	55	
Data Processing	I-32	Johnson	113	Iowa River	32	
Deere & Company	I-88	Black Hawk	5/162	Black Hawk Cr. to Cedar River	55	
Dewees Potthoff - Bowser Quarry	I-134	Linn	14/74	Big Creek to Cedar River	66	
Dewees Potthoff - Dice Sand Pit	I-135	Linn	13/74	Crabapple Cr. to Big Cr. to Cedar River	66	
Engineered Equip. Co.	I-83	Black Hawk	163	Cedar River	54	
Farmland Foods	I-12	Hardin	283	Iowa River	23	

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WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	Page Reference Needs Chapt. VIII-Pg.
Farmland Industries	I-2	Hancock	--/397	Drainage Ditch to E. Br. Iowa River	21	
Farmers Co-op Creamery - Nashua	I-45	Chickasaw	210	Cedar River	42	
Fisher Controls Co. - Center St. Facility	I-14	Marshall	5/220	Linn Cr. to Iowa River	26	
Fisher Controls Co. - General Office	I-15	Marshall	4/220	Linn Cr. to Iowa River	26	
Fisher Controls Co. - Governor Rd. Fac.	I-18	Marshall	3/220	Linn Cr. to Iowa River	26	
Greene Limestone Co. - Burns Quarry	I-53	Butler	2.4/174	Unnamed Cr. to W. Fk. Cedar to Cedar River	46	
Greene Limestone Co. - Portland Quarry	I-73	Cerro Gordo	78/174	Winnebago R. to Shell Rock to Cedar R.	50	
Greene Limestone Co. - Lubben Quarry	I-75	Butler	24/174	Coldwater Cr. to Shell Rock to Cedar R.	51	
Greene Rendering Co.	I-74	Butler	40/174	Shell Rock River	51	
Hallet Construction Co.	I-52	Franklin	46/167	Maynes Cr. to W. Fk. Cedar to Cedar R.	46	
Hallet Construction Co.	I-28	Iowa	140	Iowa River	31	
Hebel Fertilizer & Chemical Company	I-71	Cerro Gordo	76/174	Winnebago River to Shell Rock to Cedar River	50	
H.J. Heinz	I-143	Louisa	6/24	Trib. to Iowa River	70	
Hubbard Feed	I-128	Linn	2/81	Indian Cr. to Cedar River	64	
Iowa Electric Light & Power	I-11	Hardin	284	Iowa River	23	
Iowa Electric Light & Power - Sutherland Station	I-20	Marshall	220	Iowa River	27	
Iowa Electric Light & Power - 6th St. Sta.	I-112	Linn	1/87	Cedar Lake to Cedar River	62	
Iowa Electric Light & Power - Duane Arnold	I-105	Linn	94	Cedar River	60	
Iowa Electric Light & Power - Prairie Cr.	I-130	Linn	1/81	Prairie Creek to Cedar River	65	
Iowa Limestone Co.	I-7	Hardin	289	Iowa River	22	
Interstate Power Co.	I-69	Cerro Gordo	80/174	Willow Cr. to Winnebago River	50	
Iowa Public Ser. Co.	I-91	Black Hawk	162	Cedar River	55	
Iowa Southern Utilities	I-154	Des Moines	--	Mississippi River	72	
J.I. Case Company	I-151	Des Moines		Flint Cr. to Mississippi River	72	
John Deere Co.	I-81	Black Hawk	162	Cedar River	53	
Kark Rendering Co.	I-43	Mitchell	247	Cedar River	41	
Kaser Construction Co.- Keswick Quarry	I-39	Keokuk	53/44	S. Fk. English River to Iowa River	39	
Kaser Construction Co.- Mediapolis Quarry	I-145	Des Moines	--	Cedar Cr. to Flint Cr. to Mississippi River	71	
Kilborn Photo	I-133	Linn	9/77	Indian Cr. to Cedar River	65	
Kiowa Corp.	I-19	Marshall	2/220	Linn Cr. to Iowa River	26	
King's Concrete	I-115	Linn	86	Cedar River	62	
Lang Farms, Inc.	I-27	Poweshiek	43/140	Little Bear Cr. to Iowa River	30	
Lee Crawford Quarry	I-108	Linn	2/88	Morgan Creek to Cedar River	62	

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Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	 Needs Chapt. VIII-Pg.
Lehigh Portland Cement Co.	I-131	Linn	6/73	Indian Cr. to Cedar River	65	
Lehigh Portland Cement Co.	I-62	Cerro Gordo	2.2/174	Calmus Cr. to Winnebago River	49	
Lennox Industries, Inc.	I-17	Marshall	2/172	Linn Cr. to Iowa River	26	
Libby-Owens-Ford	I-67	Cerro Gordo	5/220	Winnebago River to Shell Rock to Cedar River	50	
Malcom Stone Company	I-26	Poweshiek	33/140	Bear Creek to Iowa River	30	
Martin-Marietta Corp. - Marshalltown Sand Plant	I-22	Marshall	221	Iowa River	27	
Martin-Marietta Corp. - Ferguson Quarry	I-23	Marshall	10/217	S. Timber Cr. to Iowa River	27	
Martin-Marietta Corp. - Crozier Quarry	I-31	Johnson	9/117	Knapp Cr. to Iowa River	32	
Martin-Marietta Corp. - Klein Quarry	I-36	Johnson	1/88	Clear Creek to Iowa River	36	
Martin-Marietta Corp. - Boice Quarry	I-46	Chickasaw	6/210	Little Cedar River to Cedar River	43	
Martin-Marietta Corp. - Boever Pit	I-47	Chickasaw	5/210	Little Cedar River to Cedar River	43	
Martin-Marietta Corp. - Ernivine Quarry	I-48	Chickasaw	206	Cedar River	43	
Martin-Marietta Corp. - Yokum Quarry	I-54	Black Hawk	3/174	W.Fk. Cedar River to Cedar River	46	
Martin-Marietta Corp. - Randall Quarry	I-56	Worth	74/174	Shell Rock River to Cedar River	46	
Martin-Marietta Corp. - Portland Quarry	I-72	Cerro Gordo	73/174	Winnebago River to Shell Rock River	50	
Martin-Marietta Corp. - Morgan Quarry	I-94	Black Hawk	7/146	Elk Run to Cedar River	56	
Martin-Marietta Corp. - O'Connell Sand Pit	I-95	Black Hawk	146	Cedar River	56	
Martin-Marietta Corp. - Waterloo Quarry	I-97	Black Hawk	10/142	Trib. to Cedar River	57	
Martin-Marietta Corp. - Smith Quarry	I-99	Benton	10/139	Wolf Creek to Cedar River	58	
Martin-Marietta Corp. - Sand Plant	I-121	Linn	81	Cedar River	63	
Martin-Marietta Corp. - Stone Quarry	I-136	Linn	65	Cedar River	66	
Martin-Marietta Corp. - Peden Quarry	I-138	Cedar	/44	Cedar River	67	
Mid Equipment Co.	I-84	Grundy	31/159	Black Hawk Cr. to Cedar River	54	
Midwest Mfg. Corp.	I-148	Des Moines	--	Mississippi River	72	
Midwest Nameplate Co.	I-137	Linn	64	Cedar River	66	

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Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	Needs Chapt. VIII-Pg.
Mississippi Valley Milk Producers Assoc.	I-87	Black Hawk	12/159	Black Hawk Cr. to Cedar River	55	
Natural Gas Pipeline Co.-Columbus City	I-41	Louisa	/30	Iowa River	40	
Natural Gas Pipeline Co.-Cairo Gas Storage	I-142	Louisa	8/19	Long Creek	70	
Northern Natural Gas Co.	I-1	Hancock	358	E. Branch Iowa River to Iowa River	21	
Northern Natural Gas Co.	I-86	Black Hawk	15/159	Black Hawk Cr. to Cedar River	55	
Northwestern States Portland Cement Co.	I-63	Cerro Gordo	1/171	Trib. to Winnebago River to Shell Rock River	49	
Packaging Corp. of America	I-24	Tama	3/189	Deer Creek to Iowa River	28	
Paul Niemann Const. Co.-Bloom Quarry	I-101	Black Hawk	4/133	Spring Cr. to Cedar River	59	
Penick & Ford	I-118	Linn	84	Cedar River	63	
Pepsi Cola Bottling Co., Inc.	I-82	Black Hawk	163	Cedar River	53	
P & M Stone Company - Wepking Quarry	I-60	Cerro Gordo	92/174	Winnebago River to Shell Rock River	48	
Proctor & Gamble	I-38	Johnson	6/80	Snyder Creek To Iowa River	37	
Quaker Oats	I-116	Linn	86	Cedar River	63	
Raid Quarries - Nelson Quarry	I-144	Des Moines	--	Trib. to Mississippi River	71	
Ralston Purina	I-10	Hardin	1/282	Trib. to Iowa River	23	
Rath Packing Co.	I-42	Louisa	/26	Iowa River	40	
Rath Packing Co.	I-93	Black Hawk	159	Cedar River	56	
Reinbeck Canning Co.	I-85	Grundy	21/159	Black Hawk Cr. to Cedar River	54	
Riley Bros.	I-152	Des Moines	--	Mississippi River	72	
River Products	I-33	Johnson	92	Iowa River	34	
River Products	I-141	Louisa	15/26	Long Creek	70	
Rutherford Potato Co.	I-150	Des Moines	--	Mississippi River	72	
St. Regis Paper	I-129	Linn	26/81	Prairie Cr. to Cedar River	64	
Salsbury Labs	I-44	Floyd	224	Cedar River	42	
Soft Water Ser., Inc.	I-68	Cerro Gordo	81/174	Winnebago R. to Shell Rock R. to Cedar River	50	
Soft Water Ser., Inc.	I-9	Hardin	282	Iowa River	23	
Swift Fresh Meats	I-16	Marshall	3/220	Linn Creek to Iowa River	26	
Tama Meat Packing Corp.	I-25	Tama	187	Iowa River	29	
Texaco, Inc.	I-127	Linn	3/81	Prairie Cr. to Cedar River	64	
TRW/IRC Fixed Resistors	I-149	Des Moines	--	Flint Cr. to Mississippi River	72	
Twin County Dairy	I-40	Johnson	7/44	Trib. to English R. to Iowa River	40	
U.S. Gypsum	I-146	Des Moines	--	Flint Cr. to Mississippi River	71	
U.S. Steel Corp.	I-5	Wright	334	Iowa River	22	
Viking Pump Div., Houdaille Ind.	I-79	Black Hawk	170	Cedar River	53	

TABLE V-1
POINT SOURCE
WASTEWATER DISCHARGES

Discharger	Reference Number	County	River Mile	Discharge to	Page Reference Inventory Chapt. V-Pg.	Page Reference Needs Chapt. VIII-Pg.
Waconia Sorghum	I-123	Linn	4/81	Prairie Cr. to Cedar River	64	
Walker Mfg. Co.	I-58	Winnebago	110/174	Trib. to Winnebago R. to Shell Rock R.	48	
Waterloo Industries	I-80	Black Hawk	162	Cedar River	53	
Weaver Const. Co. - Dows Quarry	I-6	Franklin	1/304	Drainage Ditch to Iowa River	22	
Weaver Const. Co. - Alden Quarry	I-8	Hardin	289	Iowa River	23	
Weaver Const. Co. - Hibness Quarry	I-51	Franklin	54/167	Maynes Cr. to W.Fk. Cedar River	45	
Weaver Const. Co. - Mason City Sand Plant	I-64	Cerro Gordo	82/174	Winnebago R. to Shell Rock River	49	
Weaver Ready Mix - Quimby Quarry	I-61	Cerro Gordo	82/174	Winnebago R. to Shell Rock River	48	
Welp & McCarten - Reuber Quarry	I-3	Hancock	348	E. Br. Iowa River	21	
Welp & McCarten - Swaledale Quarry	I-50	Cerro Gordo	61/174	Beaverdam Cr. to W. Fk. Cedar River	44	
Welp & McCarten - Kuemen Quarry	I-55	Worth	102/174	Shell Rock River To Cedar River	46	
Welp & McCarten - Stricker Quarry	I-59	Cerro Gordo	93/174	Winnebago R. to Shell Rock River	48	
Welp & McCarten - Pint Quarry	I-96	Black Hawk	4/148	Poyner Cr. to Cedar River	57	
Welp & McCarten - Newton Quarry	I-98	Black Hawk	10/147	Miller Cr. to Cedar River	57	
Wendling Quarries - Atalissa Quarry	I-139	Muscatine	--	Cedar River	68	
Wendling Quarries	I-140	Cedar	--	Sugar Cr. to Cedar River	68	
Weyerhauser Co.	I-110	Linn	87	Cedar River	62	
Wilson-Sinclair	I-119	Linn	84	Cedar River	63	
W.R. Grace	I-124	Linn	3/81	Prairie Cr. to Cedar River	64	

1/ Some abbreviations used include:

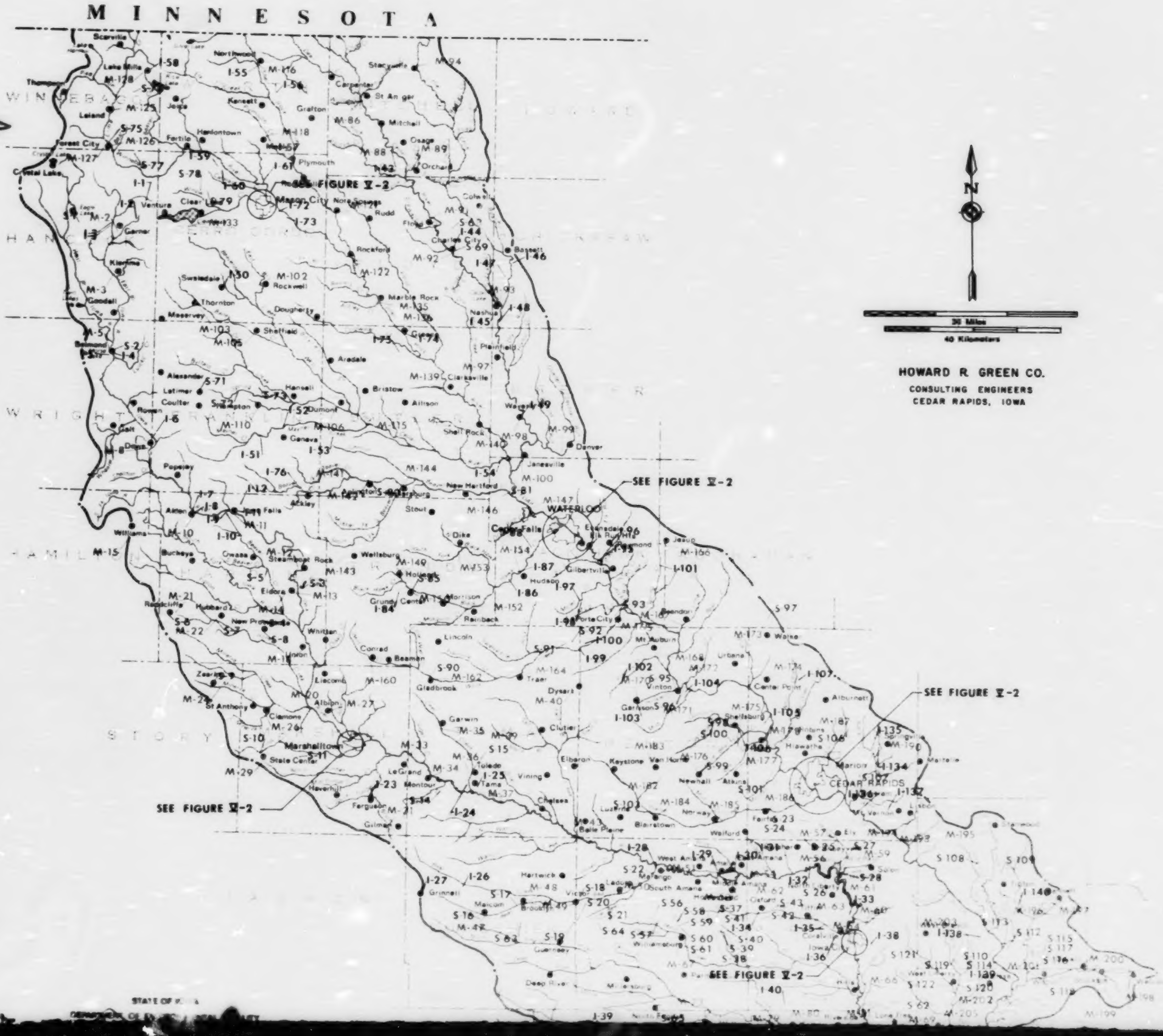
H.S. = High School
IA = Iowa
M.H.P. = Mobile Home Park
S.D. = Sanitary District
WTP = Water Treatment Plant

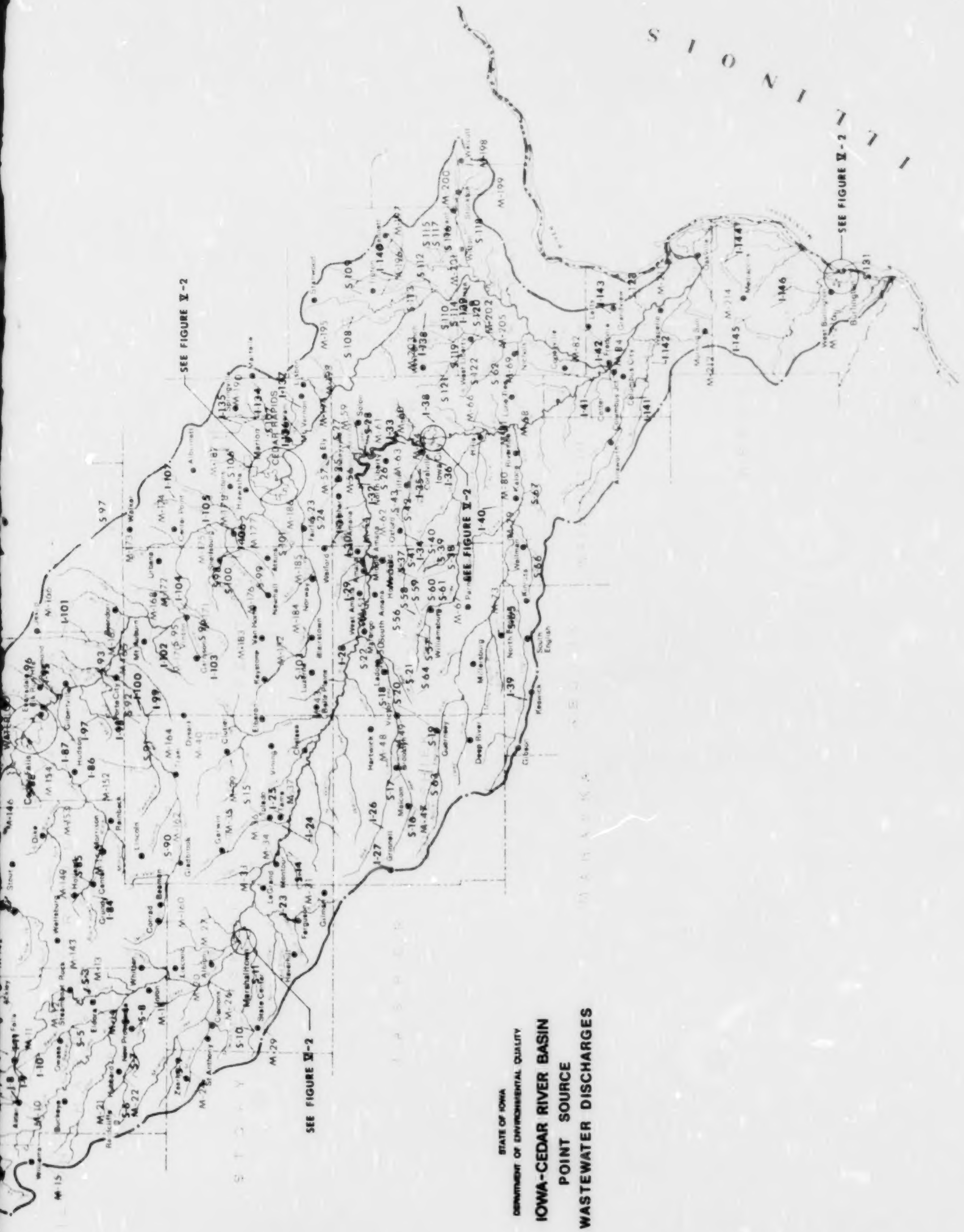
3/ Some abbreviations used include:

Br = Branch
Cr. = Creek
DD = Drainage Ditch
NEMTF = No Existing Municipal Treatment Facility
STP = Sewage Treatment Plant

2/ Where two numbers are given, the first number designates the distance of the discharger up the major tributary stream from the Iowa or Cedar River. Mile zero is at the confluence of the major tributary stream with the Iowa or Cedar. The second number designates the distance up the Iowa or Cedar River to where the major tributary stream joins the Iowa or Cedar River. Mile zero on the Iowa River is at its confluence with the Mississippi River. Mile zero on the Cedar is at its confluence with the Iowa. Mileage values increase going upstream. When only one number is listed, the discharge is directly into the main stem of the Iowa or Cedar River. The single number indicates the mileage up the Iowa or Cedar River to the point of discharge.

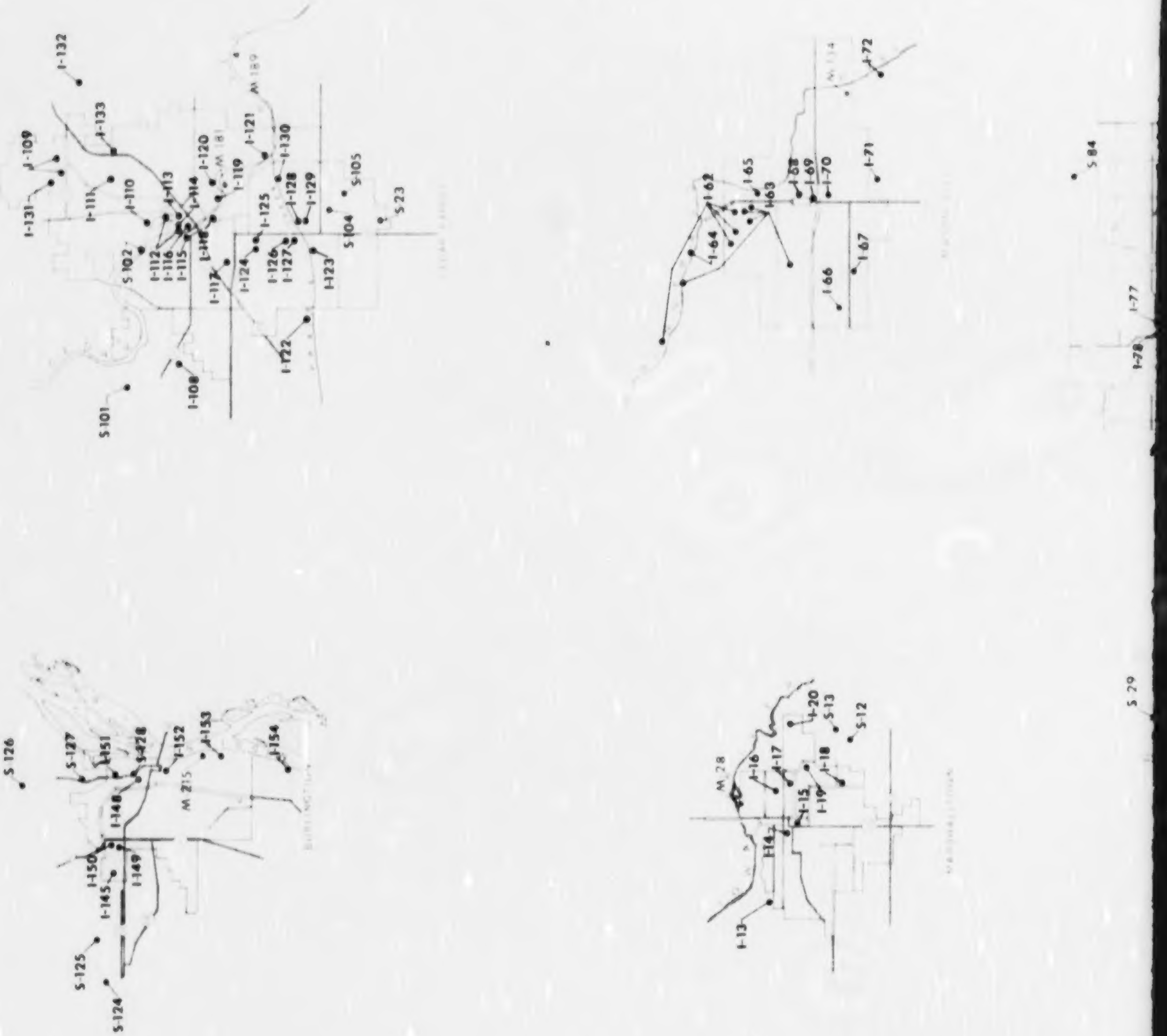
A


MINNESOTA
WINNEBAGO
HANCOCK
WRIGHT
HAMILTON
STORY
HOWARD
CHICKASAW
N
30 Miles
40 Kilometers
HOWARD R. GREEN CO.
CONSULTING ENGINEERS
CEDAR RAPIDS, IOWA
SEE FIGURE V-2
SEE FIGURE V-2
SEE FIGURE V-2
SEE FIGURE V-2
SEE FIGURE V-2
SEE FIGURE V-2
Mason City
Charles City
WATERLOO
Cedar Falls
Marshalltown
CEDAR RAPIDS
Forest City
Garner
Clear Lake
Belmond
Northwood
St Ansgar
Osage
Rockford
Rockwell
Sheffield
Nashua
Waverly
Clarksville
Allison
Shell Rock
Janesville
Denver
New Hartford
Dike
Hudson
Gilbertville
La Porte City
Vinton
Urbana
Center Point
Alburnett
Marion
Hiawatha
Shellsburg
Atkins
Newhall
Keystone
Van Horne
Belle Plaine
Blairstown
Norway
Fairfax
Walford
Tama
Toledo
Montour
Le Grand
Gilman
Ferguson
Grinnell
Malcom
Brooklyn
Victor
Ladora
Marengo
South Amana
West Amana
Oxford
Tiffin
Coralville
Iowa City
Williamsburg
Millersburg
Deep River
Guernsey
Hartwick
Chelsea
Vining
Elberon
Clutier
Dysart
Garwin
Traer
Gladbrook
Lincoln
Conrad
Beaman
Liscomb
Albion
Clemons
State Center
Haverhill
Zearing
St Anthony
Whitten
Union
Eldora
Radcliffe
Hubbard
New Providence
Steamboat Rock
Iowa Falls
Alden
Williams
Buckeye
Owasco
Popejoy
Dows
Rowan
Coulter
Latimer
Alexander
Hampton
Hansell
Dumont
Geneva
Ackley
Aplington
Parkersburg
Stout
Wellsburg
Holland
Grundy Center
Morrison
Reinbeck
Bristow
Aredale
Marble Rock
Greene
Dougherty
Thornton
Swaledale
Meservey
Plainfield
Bassett
Colwell
Floyd
Rudd
Nora Springs
Plymouth
Hanlontown
Fertile
Joice
Kensett
Grafton
Carpenter
Mitchell
Orchard
Stacyville
Lake Mills
Leland
Scarville
Thompson
Crystal Lake
Ventura
Klemme
Goodell
Kesley
Elk Run Heights
Evansdale
Raymond
Jesup
Brandon
Mt Auburn
Walker
Mt Vernon
Lisbon
Ely
Solon
Martelle
Stanwood
STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY


ILLINOIS
SEE FIGURE V-2
SEE FIGURE V-2
SEE FIGURE V-2
SEE FIGURE V-2
CEDAR RAPIDS
Marshalltown
Burlington

STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN
POINT SOURCE
WASTEWATER DISCHARGES

B FIGURE V-1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I-130
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S-105
S 104
S 23
S 102
I-112
I-116
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I-124
I-126
I-127
I-123
I-122
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S 101
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I-68
I-69
I-70
I-72
M 134
I-71
I-64
I-66
I-67
S 84
I-77
I-78
S 126
S-127
I-151
S-128
I-152
I-153
I-154
M 215
I-148
I-150
I-149
I-145
S-125
S-124
M 28
I-16
I-17
I-20
S-13
S-12
I-18
I-15
I-19
I-14
I-13
S 29

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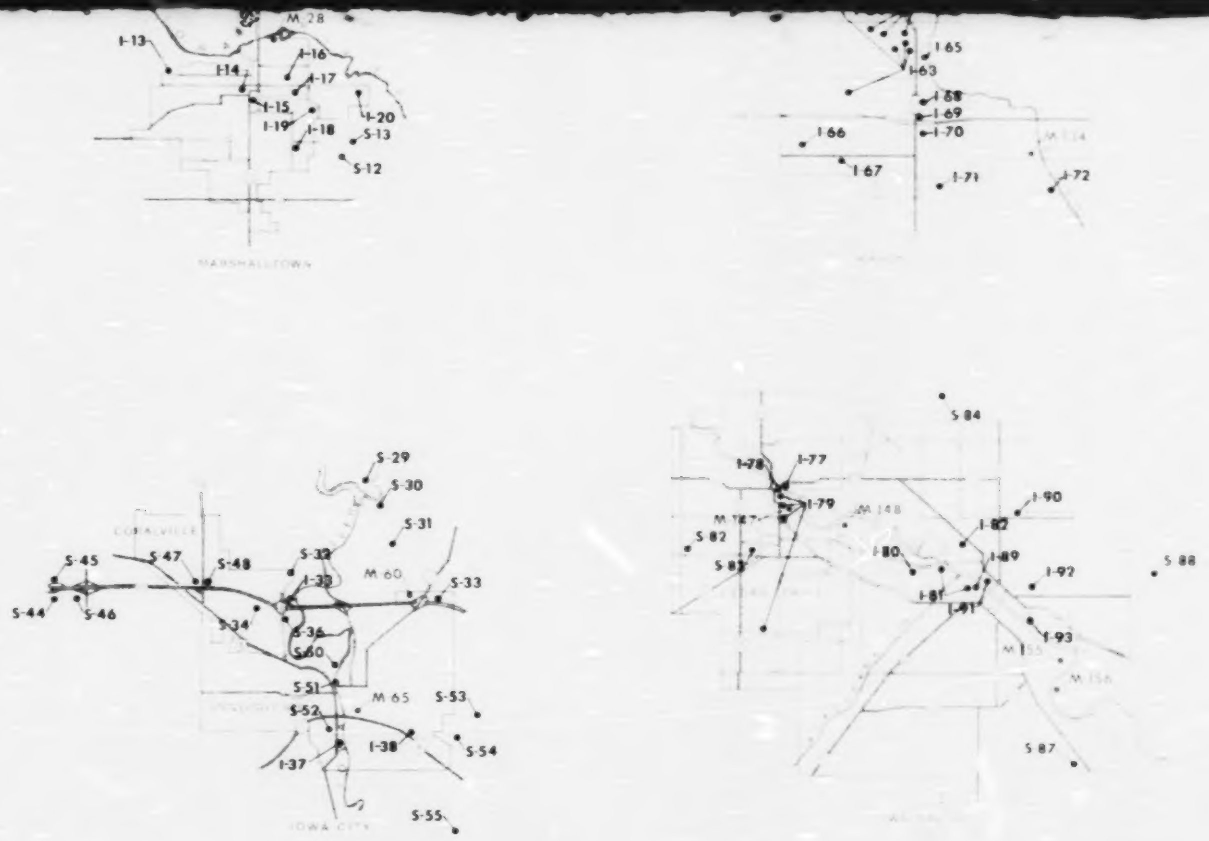

M-28
I-13
I-14
I-16
I-17
I-15
I-19
I-18
I-20
S-13
S-12
MARSHALLTOWN
I-65
I-63
I-68
I-69
I-70
I-66
I-67
I-71
M-134
I-72
S-29
S-30
S-31
CORALVILLE
S-45
S-47
S-48
S-32
I-33
M-60
S-33
S-44
S-46
S-34
S-36
S-60
S-51
S-52
M-65
S-53
I-38
S-54
I-37
S-55
IOWA CITY
S-84
I-78
I-77
I-79
M-147
M-148
S-82
S-83
I-80
I-90
I-82
I-89
I-92
S-88
I-81
I-91
I-93
M-155
M-156
S-87

STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY

POINT SOURCE WASTEWATER DISCHARGES

M-10 MUNICIPAL
I-20 INDUSTRIAL
S-30 SEMIPUBLIC

B

FIGURE V-2

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/1)/(lb/day)	Effluent Ammonia-N (mg/1)/(lb/day)	Treatment Type Sludge Disposal	Comments
Iowa River							
W. Branch Iowa River							
Crystal Lake M-1	276	--	---	---	---	NEMTF	
Hancock County Home S-1	--	35	NA/NA	---	---	Septic Tank Not Available	
E. Branch Iowa River							
Northern Natural Gas I-1	--	--	NA/.043	---	---	Septic Tanks Not Available	No Permit effluent limits Compressor cooling water
Farmland Industries I-2	--	--	---	---	---	None	Sec. 22, T96N, R23W Discharge ceased. Once only water test of new tank.
Welp & McCarten I-3 Reuber Quarry	--	--	NA/1.0	---	---	None	No permit effluent limits for: flow, BOD, NH_3-N. Quarry dewatering.
Garner M-2	2,200	2,660	.181/.266	55/83	25/38	Aerated Lagoon 3 Cell Not Applicable	Permit limits 30 mg/1 BOD
Klemme M-3	533	729	.045/.103	27/10	15/6	2 Cell Lagoon Not Applicable	Some I/I Reported
Goodell M-4	218	--	---	---	---	NEMTF	
Iowa River							
Belmond M-5	2,358	2,500	.320/.168	25/67	10/27	Trickling Filter Wet Haul to land	Facility plan submitted

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type	Comments
			Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Sludge Disposal	
Belmond WTP S-2	2,358	--	.018/NA	---	---	Lime sludge holding lagoon Haul to farm land or landfill	Filter backwash every 10 to 15 days
U.S. Steel Corp. I-4	--	--	.250/NA	No net addition	No net addition	None Not Applicable	Cooling water only from Iowa River
Central Soya I-5	--	1,350	NA/.216	22/40	2/4	2 cell aerated-aerobic lagoon Not Applicable	Permit effluent limits: Flow - .216 MGD, BOD - 40 lbs., NH_3-N, 2 mg/l
Rowan M-6	231	--	---	---	---	NEMTF	
Wheeler Creek							
Galt M-7	50	--	---	---	---	NEMTF	
Iowa River							
Weaver Const. Co. I-6 Dows Quarry	--	--	NA/.720	---	---	None	Quarry dewatering NE$\frac{1}{4}$ Sec. 30 T-91-M, R-22-W
Dows M-8	777	1,300	.067/.128	30/17	15/8	Imhoff, trickling filter Not Available	Locker plant may be overloading STP
Popejoy M-9	147	--	---	---	---	NEMTF	
Iowa Limestone Co. I-7	--	--	.008/NA	---	---	None	
Alden M-10	876	--	.060/.090	33/17	20/10	Lagoon Not Applicable	New plant under construction

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type Sludge Disposal	Comments
			Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)		
Weaver Construction Co. I-8 Alden Quarry	--	--	.002/NA	---	---	None	
Soft Water Service I-9	--	--	.022/NA	---	---	None	Water softener regeneration waste.
Ralston Purina I-10	--	--	1.534/NA	5/64	No net addition	None	Cooling water and boiler blowdown.
Iowa Falls M-11	6,454	--	.841/.775	30/210	17/119	Trickling filter Not Available	
Iowa Electric Light & Power I-11	--	--	.017/NA	---	---	None	
Farmland Foods I-12	--	--	0.450/0.450	30/113	90/338	2 anaerobic lagoons 2 aerated lagoons	Designing new treatment facilities to meet more stringent permit conditions
Iowa River							
Steamboat Rock M-12	394	--	.023/.088	51/10	23/4	Spiragester, trickling filter Not Available	
Pine Lake State Park S-3	--	106	0/0	---	---	2 cell lagoon Not Applicable	Design influent .022 MGD. Total retention system.
Eldora M-13	3,223	--	.147/0.163	25/31	15/18	Trickling filter Not Available	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
South Fork Iowa River							
Williams M-15	456	590	.055/.065	36/17	20/9	2 cell lagoon Not Applicable	5.9 surface acres
Buckeye M-16	143	--	---	---	---	NEMTF	
Quakerdale Home S-4	--	--	0.01/NA			NEMTF	
Beaver Creek							
Owasa M-17	69	--	---	---	---	NEMTF	
Hardin County Home S-5	--	--	---	---	---	Septic Tank Not Available	
Eldora Reformatory M-14	--	--	0.175/0.199	52/76	11/16	Trickling filter Not Available	
Iowa River							
Union M-18	484	--	0.049/0.053	25/10	15/6	2 cell lagoon Not Applicable	3.5 surface acres
Dowd Creek							
Whitten M-19	194	--	---	---	---	NEMTF	
Iowa River							
Liscomb M-20	328	--	.016/NA	25/3	15/2	2 cell lagoon Not Applicable	
Honey Creek							
Raddcliffe WTP S-6	548	--	---	---	---	None	Regeneration wastes from zeolite softener.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Raddcliffe M-21	548	--	.038/NA	27/9	15/5	Lagoon Not Applicable	
Honey Creek							
Hubbard M-22	846	--	0.085/0.109	32/23	20/14	Lagoon Not Applicable	
Hubbard School S-7	--	--	---	---	---	Septic Tank Not Available	
New Providence M-23	208	--	---	---	---	NEMTF	
Edrich Addition S-8	--	--	0.021/NA	55/10	30/6	Extended Aeration Not Available	
Middle Minerva Creek							
Zearing WTP S-9	535	--	.007/NA	---	---	None	Regeneration wastes from ion exchange plant.
Zearing M-24	535	--	0.054/0.080	25/11	15/7	Lagoon Not Applicable	
St. Anthony M-25	156	--	---	---	---	NEMTF	
Clemons M-26	178	--	0.038/0.030	26/8	15/5	Lagoon Not Applicable	
Chicken Creek							
Albion M-27	772	--	0.038/0.060	25/8	15/5	Lagoon Not Applicable	

TABLE V-2
DISCHARGE INVENTORY

			Effluent				
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Iowa River							
Culligan Soft Water Service I-13	--	--	0.013/NA	---	---	None	Backwash from regeneration of water softeners.
Marshalltown M-28	26,219	108,000	3.756/5.50	25/783	11/345	Activated sludge haul to farm land	
Linn Creek							
State Center WTP S-10	1,232	--	NA/NA	---	---	None	Filter backwash twice per week.
Marshall County Home S-11	--	--	NA/.066	---	---	Lagoon Not Applicable	
Fisher Control Co. - Center Street Facility I-14	--	--	0.660/NA	No net addition 5/28	No net addition .1/.55	Not Applicable	Cooling water from City well water
Fisher Control Co. - General Bldg. I-15	--	--	0.002/NA	No net addition 5/0	1.3/.02	None	Cooling tower blowdown, foundation drainage, roof runoff
Linn Creek							
Swift Fresh Meats I-16	--	--	0.120/NA	No net addition 1/1	No net addition 0.04/.04	None	Surplus cooling water from shell and tube ammonia condensers
Lennox Industries I-17	--	--	.029/NA	No net addition 5/1.2	No net addition 0.5/0.12	None	Non-contact cooling water
Fisher Controls Co. - Governor Rd. Facility I-18	--	--	0.068/NA	No net addition 5/2.8	No net addition .5/.34	None	Mainly cooling water from City water supply
Kiowa Corp. I-19	--	--	0.477/NA	5/20	.2/.8	None	Cooling & process water

TABLE V-2
DISCHARGE INVENTORY

			Effluent			Treatment Type	
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Sludge Disposal	Comments
Iowa River							
Iowa Electric Light & Power - Sutherland Station I-20	--	--	0.388/NA	---	---	None	
Central Iowa Rendering I-21	--	--	.021/NA	130/23	30/5	Cooling Basin Not Available	Cooling water to condense steam from cookers.
Martin-Marietta Corp. - Marshalltown Sand Plant I-22	--	--	0.070/0.070	---	---	None	
North Timber Creek							
State Center M-29	1,232	--	0.162/0.171	27/36	10/14	Trickling filter Not Available	Creamery discharges to sanitary sewer.
South Timber Creek							
Haverhill M-30	160	--	---	---	---	NEMTF	
Brush Creek							
Gilman M-31	513	--	0.033/0.058	25/7	15/4	Lagoon Not Applicable	
Martin-Marietta Corp. - Ferguson Quarry I-23	--	--	---	---	---	---	
Ferguson M-32	203	--	---	---	---	NEMTF	
Timber Creek							
Lincoln Terrace Estates MHP S-12	--	128	NA/.006	---	---	1 cell lagoon Not Applicable	0.4 surface acres

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Cambridge Estates MHP S-13	--	--	---	---	---	Lagoon Not Applicable	
Iowa River							
LeGrand M-33	805	--	0.059/0.063	39/19	7/3	2 cell lagoon Not Applicable	
Montour M-34	334	--	0.021/NA	38/7	20/4	Lagoon Not Applicable	
Raven Creek							
South Tama School Dist. S-14	--	--	---	---	---	Septic tank, sand filter Not Available	
Deer Creek							
Garwin M-35	563	--	0.031/.051	47/12	11/3	Septic tank, sand filter Not Available	Waste stabilization lagoon currently being proposed.
Tama County Home S-15	--	--	---	---	---	Septic tank Not Available	
Toledo M-36	2,400	--	0.200/.172	26/43	7/12	Trickling filter haul to land	
Iowa River							
Packaging Corp. of America I-24	--	--	1.0/NA	No net addition 5/42	No net addition .5/4	Spray irrigation Not Available	Cooling water from shell and tube cond. Process water irrigated.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Tama M-37	3,100	--	0.280/.233	71/166	14/33	Activated sludge Not Available	
Tama Meat Packing Corp. I-25	--	--	.770/1.00	70/450	20/128	Lagoon-7 cells Not Applicable	Controlled discharge. No discharge at 20 cfs or less.
Otter Creek							
Chelsea M-38	381	--	---	---	---	NEMTF	
Salt Creek							
Clutier M-39	275	--	.027/0.030	25/6	15/3	Lagoon Not Applicable	
Dysart M-40	1,300	--	0.110/.078	34/31	20/18	Imhoff, trickling filter Not Available	
Elberon M-41	203	--	---	---	---	NEMTF	
Vining M-42	71	--	---	---	---	NEMTF	
Iowa River							
Belle Plaine M-43	2,810	4,245	0.205/0.330	25/43	10/17	Trickling filter Not Available	
Luzerne M-44	134	--	---	---	---	NEMTF	
Honey Creek							
Hartwick M-45	101	--	---	---	---	NEMTF	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Bear Creek							
Malcom Stone Co. I-26	--	--	0.384/NA	---	---	---	
Little Bear Creek							
Grinnell M-46	8,400	--	---	---	---	---	Plant discharges to Skunk River Basin.
Lang Farms I-27	--	--	---	---	---	Septic tank Not Available	Alfalfa dehydration boiler blowdown & rest room wastes.
Dickey's Prairie Home #2 S-16	--	--	.003/NA	---	---	Lagoon Not Applicable	
Malcom M-47	388	--	0.015/0.043	31/4	20/3	2 cell lagoon Not Applicable	
Brooklyn WTP S-17	1,410	--	.001/NA	---	---	None	Iron filter backwash once per week.
Brooklyn M-48	1,410	--	0.097/0.156	39/32	20/16	Trickling filter Not Available	
Bear Creek							
Victor M-49	949	--	.083/NA	27/19	10/7	Extended aeration Not Available	
Victor WTP S-18	949	--	---	---	---	None	
Ladora M-50	321	--	.032/NA	30/8	15/4	Lagoon Not Applicable	System under construction in 1974.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Amoco S-19	--	--	.001/NA	---	---	Lagoon Not Applicable	Total retention lagoon.
Texaco Star Inn S-20	--	--	---	---	---	---	
Iowa Highway Comm. Rest Area (North Side-Victor) S-21	--	--	NA /0.004	---	---	Lagoon Not Applicable	
Sudbury Court Motel S-22	--	--	---	27/--	---	---	
Iowa River							
Hallet Const. Co. I-28	--	--	.002/NA	---	---	---	
Marengo M-51	2,235	2,650	.224/0.261	25/47	9/17	2 cell lagoon Not Applicable	20 surface acres.
Middle Amana S.D. M-52	--	--	---	---	---	NEMTF	
Amana Refrigeration I-29	--	2,200	0.900/0.900	15/113	.5/3.8	Septic tank for domestic waste Not Available	Large percentage of flow is cooling water, and some domestic waste
Homestead S.D. M-53	273	350	.027/0.034	29/7	15/3	2 cell lagoon Not Applicable	Possible overloading by locker plant and restaurants.
Amana S.D. M-54	600	3,065	.115/0.151	30/29	15/14	4 cell lagoon Not Applicable	System under construction in 1974.
Amana Woolen Mills I-30	--	--	NA/0.055	43/NA	3/NA	None	To be connected to Amana S.D. sewer system.
Knapp Creek							

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Walford M-55	286	--	---	---	---	NEMTF	Plans for a new system have been submitted to DEQ
Martin-Marietta Corp. - Crozier Quarry I-31	--	--	.531/NA	---	---	None	Dewatering Quarry
Swisher Creek							
Swisher M-56	417	900	.039/0.090	25/8	10/3	Extended aeration Not Available	
Iowa River							
Data Processing I-32	--	--	---	---	---	Lagoon Not Applicable	
Hoosier Creek							
College Community School District S-23	--	350	NA/0.023	---	---	2 cell lagoon Not Applicable	2.5 surface acres
Ely M-57	275	300	.028/0.030	26/6	15/4	1 cell lagoon Not Applicable	
Iowa Highway Comm. I-380 (Swisher) W. Side S-24	--	--	---	---	---	Lagoon Not Applicable	Total retention system.
Iowa Highway Comm. I-380 (Swisher) E. Side S-25	--	--	---	---	---	Lagoon Not Applicable	Total retention system.
Shueyville M-58	187	--	---	---	---	NEMTF	
Iowa River							
IO-DIS-E-CA Lutheran Church Camp S-26	--	200	NA/0.010	---	---	Lagoon Not Applicable	Total retention system

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Lake McBride State Park S-27	--	--	---	---	---	2 cell lagoon Not Applicable	
Mill Creek							
Solon M-59	837	1,000	.086/0.060	27/20	10/7	Imhoff, trickling filter Drying Beds	Discharge to Lake McBride. Preliminary report submitted to DEQ for plant modification.
Iowa River							
Cottage Reserve Corp. S-28	--	--	---	---	---	Imhoff, trickling filter Not Available	
Turkey Creek							
Lakeview Knolls S-29	--	400	NA/0.040	25/NA	10/NA	Activated sludge Not Available	
Iowa River							
Coral Marina S-30	--	20	NA/0.001	---	---	---	
Sanders Creek							
Timber Trail Estate S-31	--	35	---	56/NA	---	Lagoon Not Applicable	
Rapid Creek							
Highlander Supper Club S-33	--	--	NA/0.015	---	---	2 cell lagoon Not Applicable	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/1)/(lb/day)	Effluent Ammonia-N (mg/1)/(lb/day)	Treatment Type Sludge Disposal	Comments
Iowa City Westinghouse M-60	--	103	.005/0.005	30/1	15/1	2 cell lagoon Not Applicable	
Muddy Creek							
North Liberty M-61	1,055	1,250	.161/.125	35/47	20/27	Imhoff, trickling filter Sludge beds & wet haul	Excessive I/I reported.
Lakewood Hills S-32	--	500	---	---	---	Lagoon Not Applicable	
Iowa River							
River Products I-33	--	--	NA/0.480	---	---	None	Aggregate wash water.
Coralville WTP S-34	6,130	--	NA/0.050	---	---	Lagoon Not Applicable	Backwash water once per week.
Western Hills MPH S-35	--	--	---	---	---	Aerated lagoon Not Applicable	To connect to Coralville sanitary sewer in future.
Texaco S-36	--	--	---	---	---	None	Storm water runoff.
Clear Creek							
Colony Enterprises S-37	--	150	NA/0.012	60/NA	---	Lagoon Not Applicable	
Amana Nordstrom Holiday Inn S-38	--	1,400	.040/0.020	84/28	NA/NA	2 cell lagoon Not Applicable	System appears organically and hydraulically overloaded.
Skelly Station S-39	--	60	NA/0.0003	---	---	Lagoon Not Applicable	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	 BOD_5 (mg/l)/(lb/day)	 Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Nickerson Farms S-40	--	--	---	---	---	Lagoon Not Applicable	
Safari Inn Campground S-41	--	--	---	---	---	Lagoon Not Applicable	
Mobil Oil S-42	--	124	---	---	---	Lagoon Not Applicable	
Buck Hummer Trucking I-34	--	--	---	50/NA	---	None	Truck washing operation
Oxford M-62	666	700	0.044/0.070	25/9	10/4	Imhoff, trickling filter Drying beds	I/I problems reported.
Clear Creek							
Parkview MHP S-43	--	--	---	---	---	Lagoon Not Applicable	
Iowa Highway Comm. I-80 (Tiffin) South Side S-44	--	--	NA/0.003	---	---	Lagoon Not Applicable	
Iowa Highway Comm. I-80 (Tiffin) North Side S-45	--	--	NA/0.003	---	---	Lagoon Not Applicable	
Texaco - Tiffin S-46	--	360	---	---	---	Lagoon Not Applicable	
Tiffin M-63	299	400	.029/0.040	25/6	10/2	Extend aeration, polishing pond Sludge lagoon	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Allied Mills I-35	--	--	NA/0.005	No net addition ---	No net addition ---	None	Cooling & boiler blowdown water.
Martin-Marietta Corp. - Klein Quarry I-36	--	--	NA/0.223	---	---	None	Dewatering quarry.
Ramada Inn S-47	--	540	NA/.015	---	---	---	
Holiday Inn S-48	--	136	NA/.025	---	---	Activated sludge Not Available	
Johnson County Home S-49	--	114	NA/0.011	---	---	1 cell lagoon Not Applicable	
Iowa River							
Iowa City WTP S-50	46,850	--	---	---	---	None	
University of Iowa Physical Plant S-51	--	--	.037/NA	---	---	None	Boiler blowdown filter backwash.
Ralston Creek							
Culligan Water I-37	--	--	NA/0.020	---	---	None	Water softener regeneration wastes.
Iowa River							
Iowa City Main Plant M-65	46,850	66,000	6.276/8.0	25/1308	10/523	Trickling filter Drying beds	I/I problem reported
Coralville M-64	6,130	19,765	1.074/1.750	31/278	20/179	Contact stabilization Haul to land	May have I/I problem.
University Heights M-169	1,265	--	---	---	---	Discharge to Iowa City Main Plant	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Indian Lookout MHP S-52	--	--	---	25/NA	---	2 cell lagoon Not Applicable	
Snyder Creek							
Far Horizons S-53	--	104	---	---	---	Lagoon Not Applicable	
Sunrise Village MHP S-54	--	--	---	---	---	Lagoon Not Applicable	
Proctor & Gamble I-38	--	--	---	25/NA	---	None	Discharge only occurs when runoff is less than 25 mg/l BOD_5. Otherwise runoff pumped to City system.
Starlight MHP S-55	--	--	---	---	---	---	
Iowa River							
Hills M-66	507	475	0.055/0.037	25/11	10/5	Extended aeration Not Available	I/I problem reported.
Old Mans Creek							
Conoco Station S-56	--	--	NA/0.005	---	---	Lagoon Not Applicable	
Iowa County Home S-57	--	--	---	---	---	Septic tank Not Available	
Old Mans Creek							
Landmark Phillips 66 S-58	--	--	---	113/NA	---	Septic tank Not Available	
Middle America S-59	--	--	NA/0.001	30/NA	15/NA	Lagoon Not Applicable	

TABLE V-2
DISCHARGE INVENTORY

			Effluent			Treatment Type	
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/1)/(lb/day)	Ammonia-N (mg/1)/(lb/day)	Sludge Disposal	Comments
Amoco Oil Company S-60	--	--	NA/0.001	---	---	Septic tank leaching field Not Available	
Williamsburg M-67	1,807	2,000	0.181/0.210	30/45	15/23	Contact stabilization	
Williamsburg WTP S-61	1,807	--	---	---	---	Lagoon Landfill	Backwash settling pond.
Iowa River							
Lone Tree - North Lagoon M-68	834	844	.065/0.081	32/17	20/11	2 cell lagoon Not applicable	Under renovation in 1975.
Lone Tree - South Lagoon M-69	834	281	0.018/0.028	30/5	15/2	3 cell lagoon Not applicable	Under construction in 1975.
Lone Tree WTP S-62	834	--	NA/0.013	---	---	None	Filter backwash one day/week.
North English River							
Brannian Service Station & Restaurant S-63	--	100	NA/0.007	---	---	1 cell lagoon Not Applicable	1 surface acre.
Guernsey M-70	94	--	---	---	---	NEMTF	
Deep River							
Deep River M-71	323	--	---	---	---	NEMTF	
North English River							

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Iowa Highway Comm. I-80 (Victor) South Side S-64	--	--	NA/0.004	---	---	Lagoon Not Applicable	
Middle English River							
Millersburg M-72	187	--	---	---	---	NEMTF	
North English WTP S-65	965	--	---	---	---	None	Backwash water only.
North English M-73	965	2,028	.132/0.072	35/39	20/22	Trickling filter Drying beds	
Parnell M-74	175	--	---	---	---	NEMTF	
South English River							
Gibson M-75	80	--	---	--	---	NEMTF	
Kaser Const. Co. - Keswick Quarry I-39	--	--	NA/0.110	---	---	Settling pond Not Applicable	Dewatering quarry NW$\frac{1}{4}$; Sec. 21; T77N; R12 W
Keswick M-76	257	--	---	---	---	NEMTF	
South English M-77	218	--	---	---	---	NEMTF	
Smith Creek							
Kinross M-78	97	--	---	---	---	NEMTF	
Wellman WTP S-66	1,068	--	---	---	---	None	Iron filter backwash.
Wellman M-79	1,068	2,765	.107/0.150	30/27	10/9	Trickling filter Lagoon	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Ramsey Creek							
Twin County Dairy I-40	--	--	.015/0.015	107/13	11/1.4	Lagoon Not Applicable	0.75 surface acres.
English River							
Green Acres MHP S-67	--	--	NA/0.015	---	---	Lagoon Not Applicable	
Kalona M-80	1,488	2,300	.631/0.428	27/142	15/79	3 cell lagoon Not Applicable	40 surface acres. I/I problems reported.
Riverside M-81	758	700	.045/0.050	25/9	10/4	Extended aeration Not Available	
Honey Creek							
Conesville M-82	295	400	.043/0.040	25/9	15/5	3 cell lagoon Not Applicable	4 surface acres.
Iowa River							
Natural Gas Pipeline Co. Columbus City I-41	--	--	NA/0.150	---	---	None	Groundwater pumping test.
Cotter M-83	55	--	---	---	---	NEMTF	
Rath Packing Co. I-42	--	26,500	.525 /0.600	45/197	76/333	Lagoon Not Applicable	2 anaerobic, 1 aerobic cells.
Columbus Jct. M-84	1,205	1,200	.120/0.120	44/44	25/25	2 cell lagoon Not Applicable	8 surface acres.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Cedar River							
Deer Creek							
Carpenter M-85	122	--	---	---	---	NEMTF	
Cedar River							
St. Ansgar M-86	994	--	0.090/0.120	46/35	25/19	Lagoon Not Applicable	Operation problems reported during spring thaw.
Mitchell M-87	233	--	---	---	---	NEMTF	
Sugar Creek							
Osage M-88	3,815	--	0.269/0.336	51/114	30/67	Trickling filter Not Available	New 1.36 MGD activated sludge plant under construction.
Cedar River							
Kark Rendering I-43	--	--	0.150/NA	1235/NA	---	---	Plant closed moved to Blue Earth, Minnesota
Spring Creek							
Orchard M-89	115	--	.011/NA	30/2.8	15/1.4	Septic tank Not Available	
Rock Creek							
Grafton M-90	254	--	---	---	---	NEMTF	
Cedar River							

TABLE V-2
DISCHARGE INVENTORY

			Effluent			Treatment Type	
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Sludge Disposal	Comments
Floyd M-91	380	--	.060/NA	25/13	15/8	Aerated lagoon Not Applicable	
John Haas Housing Dev. S-68	--	--	---	---	---	Lagoon Not Applicable	
Charles City WTP S-69	9,269	--	NA/.030	---	---	Thickener Not Available	Filter backwash and sludge thickening.
Salsbury Lab. I-44	--	--	.075-.20/NA	No Net Increase	No Net Increase	None	Cooling water.
Charles City M-92	9,269	--	1.882/2.440	56/879	42/659	Trickling filter Not Available	Reports of flooding resulting in discharges of raw sewage.
Farmers Co-op Creamery I-45	--	--	NA/.015	1360/NA	---	None	Cooling and process water.
Nashua M-93	1,712	--	0.135/0.079	78/88	28/32	Imhoff, trickling filter Not Available	
Little Cedar River							
Stacyville M-94	598	--	0.025/0.030	29/6	10/2	Imhoff, trickling filter Not Available	
Beaver Creek							
Colwell M-95	100	--	---	---	---	NEMTF	
Bassett M-96	152	--	---	---	---	NEMTF	Waste stabilization lagoon has been proposed
Little Cedar River							

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	 BOD$_5$ (mg/l)/(lb/day)	 Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Martin-Marietta Corp. Boice Quarry I-46	--	--	NA/0.10	---	---	None	Dewatering Quarry.
Martin-Marietta Corp. Boever Pit I-47	--	--	0.050/NA	---	---	None	Dewatering Quarry.
Cedar River							
Martin-Marietta Corp. Ernivine Quarry I-48	--	--	0.050/0.050	---	---	None	Process water NE¼ Sec. 29 T94N, R14W
Plainfield M-97	446	--	0.010/NA	150/13	45/4	Septic tank, lagoon Not Available	New treatment facility has been proposed.
Carnation Co. I-49	--	--	0.15-.55/NA	.05-.075/NA	0.0035-.0050/NA	---	Cooling water.
Waverly M-98	7,205	--	0.639/1.085	33/176	20/107	Trickling filter Haul to farm land	STP periodically overloaded and discharging raw sewage.
Highway #3 MHP S-70	--	--	---	---	---	Lagoon Not Applicable	
Quarter Section Run							
Denver M-99	1,169	--	0.062/0.150	26/13	15/8	2 cell lagoon Not Applicable	
Cedar River							
Janesville M-100	741	--	0.030/0.030	250/63	30/8	Imhoff, trickling filter Not Available	
West Fork Cedar River							

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent: Flow (mgd) Average/Design	Effluent: BOD_5 (mg/l)/(lb/day)	Effluent: Ammonia-N (mg/l)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Beaverdam Creek							
Clear Lake S.D. M-133	6,876	--	1.696/2.352	25/354	10/141	Trickling filter Land disposal	
Swaledale M-101	222	--	---	---	---	NEMTF	Waste stabilization lagoon has been proposed.
Welp & McCarten, Inc. Swaledale Quarry I-50	--	--	2.5/2.5	---	---	None	Detwatering Quarry SW¼ Sec. 10 T94N, R21W
Rockwell M-102	942	--	.085/.073	83/59	15/11	Rapid sand filter Not Available	
Bailey Creek							
Thornton M-103	410	--	0.037/0.060	25/8	15/5	Lagoon Not Applicable	
Meservey M-104	354	--	---	---	---	NEMTF	Waste stabilization lagoon has been proposed.
Sheffield M-105	1,070	--	0.181/0.143	26/39	15/23	Lagoon Not Applicable	
West Fork Cedar River							
Dumont M-106	724	--	.304/0.250	25/63	15/38	Lagoon Not Applicable	10.7 surface acres.
Buffalo Creek							
Alexander M-107	249	--	---	---	---	NEMTF	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Otter Creek							
Terrace Hill S.D. S-73	--	--	---	---	---	None	Sec. 15, T92N, R20W
Spring Creek							
Latimer WTP S-71	393	--	NA/0.008	---	---	None	Filter backwash once per week.
Latimer M-108	393	--	---	---	---	NEMTF	
Beeds Lake State Park S-72	--	--	0.063/NA	---	---	Lagoon Not Applicable	
Otter Creek							
Hansell M-109	124	--	---	---	---	NEMTF	
Squaw Creek							
Hampton M-110	4,376	--	.585/0.620	33/161	8/39	Trickling filter Drying beds	
Boylan Creek							
Aredale M-111	126	--	---	---	---	NEMTF	
Bristow M-112	230	--	---	---	---	NEMTF	
Maynes Creek							
Coulter M-113	262	--	---	---	---	NEMTF	
Weaver Const. Co. Hibness Quarry I-51	--	--	2.400/2.400	---	---	---	Dewatering Quarry.
Geneva M-114	201	--	---	---	---	NEMTF	

TABLE V-2
DISCHARGE INVENTORY

			Effluent				
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Hallett Const. Co. I-52	--	--	1.500/1.500	---	---	---	Aggregate washing.
Greene Limestone Co. - Burns Quarry I-53	--	--	0.75/0.9	---	---	---	Dewatering Quarry.
West Fork Cedar River							
Allison M-115	1,071	--	0.099/0.200	25/21	15/12	Lagoon Not Applicable	
Martin-Marietta Corp. - Yokom Quarry I-54	--	--	NA/1.03	---	---	None	Dewatering Quarry SW¼ Sec. 4, T90N, R14W
Shell Rock River							
Northwood M-116	1,950	--	.161/0.180	35/47	11/15	Rapid sand filter Haul to land	
Welp & McCarten, Inc. - Kuemen Quarry I-55	--	--	1.500/1.500	---	---	None	Dewatering Quarry NW¼, Sec. 9, T99N, R20W
Martin-Marietta Corp. - Randall Quarry I-56	--	--	0.480/0.480	---	---	None	Aggregate washing SE¼, Sec. 23, T99N, R19W
Kensett M-117	361	--	---	---	---	NEMTF	
Rose Creek							
Manly M-118	1,294	--	.129/0.075	110/118	22/24	Lagoon Not Applicable	
Chicago Rock Island & Pacific R.R. I-57	--	--	NA/0.189	---	---	---	Diesel washing.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type Sludge Disposal	Comments
			Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)		
Plymouth M-119	41	--	---	---	---	NEMTF	
Shell Rock River							
Rockfalls M-120	150	--	---	---	---	NEMTF	
Nora Springs M-121	1,337	--	.116/NA	37/36	25/24	Trickling filter Haul to Land	
Rockford M-122	902	-	.090/NA	30/23	15/11	Lagoon Not Applicable	
Winnebago River							
D.D. 18							
Scarville M-123	81	--	---	---	---	NEMTF	
Dike Run Creek							
Thompson M-124	600	--	---	---	---	NEMTF	
Winnebago River							
Winnebago County Home S-74	--	--	NA/0.002	---	---	Septic tank Not Available	
Leland M-125	223	--	0.022/0.033	30/6	15/3	Lagoon Not Applicable	
Forest City WTP S-75	3,841	--	---	---	---	None	
Forest City (E) M-126	3,841	6,100	.337/0.600	25/70	7/20	Trickling filter Haul to land	

TABLE V-2
DISCHARGE INVENTORY

			Effluent				
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Forest City (SW) M-127	--	2,758	0.132/0.276	25/28	5/6	Lagoon Not Applicable	29 surface acres.
Country Side Court S-76	--	--	---	---	---	Septic tanks Filter beds	
Pilot Knob State Park S-77	--	--	---	---	---	Lagoon Not Applicable	
Beaver Creek							
Lake Mills M-128	2,124	--	0.231/0.187	37/71	20/39	Trickling filter Haul to land	
Walker Mfg. I-58	--	--	0.023/NA	No Net Addition	---	---	Sanitary wastes discharged to Lake Mills STP.
Winnebago River							
Fertile M-129	394	--	---	---	---	NEMTF	
Winan's Creek							
Joice M-130	201	--	---	---	---	NEMTF	
Hanlontown M-131	182	--	---	---	---	NEMTF	
Winnebago River							
Welp & McCarten, Inc. - Stricker Quarry I-59	--	--	6.0/6.0	---	---	None	Dewatering Quarry Sec. 15, T97N, R21W
P& M Stone Co. - Wepking Quarry I-60	--	--	NA/0.050	---	---	---	Dewatering Quarry NW$\frac{1}{4}$, Sec. 15, T97N, R21W
Weaver Ready Mix - Quimby Quarry I-61	--	--	---	---	---	---	Dewatering Quarry NW$\frac{1}{4}$, Sec. 27, T97N, R20W

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Lehigh Portland Cement Company I-62	--	--	15.4/15.4	---	---	None	Steam condenser cooling water.
			0.97/0.97				Bearing cooling water.
			0.97/0.97				Bearing cooling water.
			0.97/0.97				Bearing cooling water.
			0.14/0.14				Surface water.
			2.16/2.16				Dewatering quarry.
			0.144/0.144				Dewatering quarry.
			0.072/0.072				Dewatering quarry.
Northwestern States Portland Cement Co. I-63	--	--	0.6/0.6	---	---	None	Plant cooling.
			1.0/1.0				Dewatering quarry.
			0.208/0.208				Dewatering quarry.
			0.137/0.137				Dewatering quarry.
			1.75/1.75				Dewatering quarry.
			0.275/0.275				Excess water pumped from deep well.
Weaver Const. Co. - Mason City Sand Plant I-64	--	--	0.70 /0.70	---	---	None	Aggregate washing dewatering pit - Sec. 29, T97N, R20W
Armour & Co. I-65	--	--	0.640/NA	90/480	---	Trickling filter lagoon Not Available	Designing system to discharge wastes to municipal sanitary system.
Willow Creek							
Ventura M-132	543	--	---	---	---	NEMTF	To Clear Lake S.D.
Iowa Highway Comm. I-35 (Mason City) West Side S-78	--	--	NA/0.002	---	---	2 cell lagoon Not Applicable	Sec. 32, T97N, R21W
Iowa Highway Comm. I-35 (Mason City) East Side S-79	--	--	---	---	---	---	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Allied Mills I-66	--	--	0.022/NA 0.004/NA	---	---	---	Sanitary wastes. Process wastes.
Libby Ownes Ford I-67	--	--	0.058/0.058	---	---	None	Cooling water and insulating glass wash water.
Soft Water Service, Inc. I-68	--	--	NA/0.056	---	---	None	Backwash from regeneration of water softeners.
Interstate Power Co. I-69	--	--	8.5-13.8/8.500	No Net Increase	No Net Increase	None	Cooling water from river.
Chicago, Milwaukee, St. Paul & Pacific R.R. I-70	--	--	NA/0.001	---	---	Oil separator and skimmer Not Available	Servicing locomotives.
Winnebago River							
Mason City M-134	31,839	--	4.920/4.150	27/1108	9/369	Trickling filter, activated sludge Haul to land	Excessive infiltration reported. Nitrification facilities under construction.
Hebel Fertilizer & Chemical Co. I-71	--	--	No Discharge	---	---	None	Insufficient data.
Martin-Marietta Corp. - Portland Quarry I-72	--	--	0.710/0.710	---	---	None	Dewatering Quarry $SW\frac{1}{4}$, Sec. 28, T96N, R19W
Greene Limestone Co. - Portland Quarry I-73	--	--	0.90/NA	---	---	Lagoon Not Applicable	Dewatering Quarry $NE\frac{1}{4}$, Sec. 29, T96N, R19W
Shell Rock River							
Marble Rock M-135	461	--	.046/NA	30/12	15/6	2 cell lagoon Not Applicable	5 surface acre lagoon under construction.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	 BOD_5 (mg/l)/(lb/day)	 Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Greene M-136	1,363	--	.136/0.171	48/54	33/37	Imhoff, trickling filter Haul to land	Flooding problems reported in spring.
Greene Rendering Company I-74	--	--	NA/0.030	---	---	2 cell lagoon Not Applicable	
Coldwater Creek							
Dougherty M-137	135	--	---	---	---	NEMTF	
Greene Limestone Co. - Lubben Quarry I-75	--	--	.900/0.900	---	---	None	Dewatering Quarry.
Flood Creek							
Rudd M-138	429	--	---	---	---	NEMTF	
Shell Rock River							
Clarksville M-139	1,360	--	0.092/0.060	74/57	17/13	Septic tank Not Available	Plans submitted to DEQ for new treatment facility.
Shell Rock M-140	1,159	--	.116/NA	51/49	24/23	Trickling filter Haul to land	
Beaver Creek							
Ackley Food Processors, Inc. I-76	--	--	.028/0.080	---	---	---	Cooling water boiler feed water. 10 mg/l oil - 30 mg/l S.S.
Middle Fork of S. Beaver Cr.							
Ackley M-141	1,794	--	0.189/0.200	28/44	10/16	Trickling filter Haul to land	
Aplington WTP S-80	936	--	---	---	---	None	

TABLE V-2
DISCHARGE INVENTORY

			Effluent				
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Aplington M-142	936	--	0.053/0.153	40/18	17/8	Trickling filter Not Available	
South Fork Beaver Creek							
Wellsburg M-143	754	--	0.040/0.094	68/23	30/10	Imhoff, trickling filter Not Available	
Beaver Creek							
Parkersburg M-144	1,631	--	.160/0.060	59/79	25/33	Lagoon Not Applicable	New lagoons under construction. Design flow of 0.201 MGD.
Stout M-145	196	--	---	---	---	NEMTF	
New Hartford M-146	690	--	0.069/0.099	30/17	15/9	Lagoon Not Applicable	
West Hill Housing Dev. S-81	--	--	NA/0.024	---	---	---	Proposed activated sludge plant and polishing pond.
Cedar River							
Clay Equipment Co. I-77	--	--	---	---	---	Lagoon Not Applicable	Total retention facility for cyanide waste.
Dry Run Creek							
Cedar Falls Utilities I-78	--	--	5.400/5.400	---	---	None	Cooling water and boiler blowdown.
Cedar River							

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/1)/(lb/day)	Effluent Ammonia-N (mg/1)/(lb/day)	Treatment Type Sludge Disposal	Comments
Viking Pump Div., Houdaille, Ind. I-79	--	--	NA/0.017	---	---	---	Air conditioning & steam jenny.
			NA/0.002				Cooling water.
			NA/0.0003				Boiler blowdown.
			NA/0.002				Alloys foundry drain.
			NA/0.006				Iron foundry drain & cooling water.
			NA/0.004				Cooling water, quech tank
			NA/0.002				Roof drains, and cooling water.
Cedar Falls Main Plant M-147	32,964	--	3.717/4.230	25/775	5/155	Trickling filter Not Available	
Cedar Falls Mobile Home Village S-82	--	300	---	---	---	3 cell lagoon Not Applicable	2.6 surface acres.
UNI Plant Services S-83	--	--	---	No Net Addition	No Net Addition	2 settling pits Not Available	Lime sludge, fly ash, and boiler blowdown.
Cedar Falls - Cedar Heights STP M-148	--	--	.050/NA	30/13	10/4	Imhoff, trickling filter Not Available	
Black Hawk County Home S-84	--	--	---	---	---	---	
Waterloo Industries I-80	--	--	0.10/.080	---	---	None	Cooling & rinse water
John Deere Company I-81					---	None	
001	--	--	7.776/NA	---			
			23.911/NA	---			
003	--	--	2.46/NA	6/123			
			1.65/NA	---			
			0.8/NA	---			
			1.22/NA	---			
Pepsi Cola Bottling Co. I-82	--	--	NA/0.0126	127/NA	---	None	Process water and rinse water.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	 BOD_5 (mg/1)/(lb/day)	 Ammonia-N (mg/1)/(lb/day)	Treatment Type Sludge Disposal	Comments
Engineered Equipment Company I-83	--	300	0.0045/NA	---	---	1 cell lagoon Not Applicable	
Black Hawk Creek							
Holland M-149	258	--	.026/NA	30/7	15/3	3 cell lagoon Not Applicable	
Mid Equipment Co. I-84	--	--	---	---	---	2 cell lagoon Not Applicable	1.4 surface acres.
Grundy Center WTP S-85	2,712	--	0.012/0.0	---	---	None	Iron removal filter backwash water once every 10 days.
Grundy Center M-150	2,712	--	0.355/0.180	50/148	12/36	Trickling filter Not Available	
Morrison M-151	136	--	---	---	---	NEMTF	
Dietrick MHP S-86	--	--	---	---	---	Lagoon Not Applicable	90 units.
Reinbeck M-152	1,711	--	0.212/0.100	71/126	16/28	Imhoff, trickling filter Haul to land	
Reinbeck Canning Co. I-85	--	--	No Discharge	No Discharge	---	Ridge & furrow irrigation Not Applicable	Canning wastes (Seasonal)
North Black Hawk Creek							
Dike M-153	794	--	.137/NA	32/37	20/23	Trickling filter Not Available	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type Sludge Disposal	Comments
			Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)		
Black Hawk Creek							
Northern Natural Gas Co. I-86	--	--	7.050/NA	---	---	None	Discharges from September to November.
M.V.M.P.A. I-87	--	--	0.675/NA	---	---	None	Cooling water. Process water to Hudson STP.
Hudson M-154	1,535	--	0.149/0.100	143/178	20/25	Trickling filter Not Available	
Deere & Company I-88 Engine Plant 004, 006, 007	--	--	---	---	---	Extended aeration Not Available	Overflow contains heavy concentration of sulfur bacteria.
Cedar River							
C.W. Shirey Co. I-89	--	--	0.010/NA	---	---	---	Truck wash water.
Virden Creek							
Chamberlain Mfg. Co. I-90	--	--	.3/NA	---	---	---	Cooling water.
Iowa Public Service Company I-91	--	--	88.16/NA 0.43/NA 0.40/NA 0.033/NA 0.030/NA 0.049/NA 0.200/NA	---	---	None	All water except 0.13 MGD is surface water.
Cedar River							
Construction Machinery Company I-92	--	--	0.005/NA	---	---	---	Cooling water.

TABLE V-2
DISCHARGE INVENTORY

			Effluent			Treatment Type	
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Sludge Disposal	Comments
Rath Packing Co. I-93	--	--	2.6/NA 2.48/NA	---	---	---	Cooling water.
Waterloo M-155	75,533	--	14.959/18.270	45/5614	25/3119	Trickling filter Haul to land	
Evansdale M-156	5,038	--	.470/0.680	25/98	7/27	Activated sludge, polishing pond Haul to land	Infiltration problems reported during periods of wet weather.
Cedar Knoll MHP S-87	--	--	NA/.002	31/NA	---	Lagoon	213 units.
Elk Run							
Elk Run School S-88	--	--	NA/0.005	---	---	Septic tank, sand filter Not Available	
Elk Run Heights M-157	1,175	--	.057/.174	25/12	10/5	Extended aeration, polishing lagoon Not Available	
Martin-Marietta Corp. - Morgan Quarry I-94	--	--	NA/1.128	---	---	None	Dewatering Quarry NE¼, Sec. 15, T89N, R12W
Cedar River							
Martin-Marietta Corp. - O-Connell Sand Pit I-95	--	--	NA/.500	---	---	None	Aggregate washing Sec. 16, T88N, R12W
Prairie View Acres Mobile Home Village S-89	--	--	---	---	---	Lagoon Not Applicable	
Poyner Creek							

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type	Comments
			Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Sludge Disposal	
Welp & McCarten, Inc. Pint Quarry I-96	--	--	1.000/NA	---	---	---	Dewatering Quarry
Raymond M-158	582	--	---	---	---	NEMTF	
Cedar River							
Gilbertville M-159	655	--	---	---	---	NEMTF	DEQ construction permit issued for an activated sludge plant in 1974. Design flow 0.200 MGD.
Miller Creek							
Martin-Marietta Corp.- Waterloo Quarry I-97	--	--	NA/0.540	---	---	None	Dewatering Quarry NW$\frac{1}{4}$, Sec. 18, T87N, R12W.
Welp & McCarten, Inc.- Newton Quarry I-98	--	--	NA/3.000 NA/4.000	---	---	None	Dewatering Quarry NE$\frac{1}{4}$, Sec. 13, T87N, R13W.
Wolf Creek							
Conrad M-160	932	--	0.050/0.090	29/12	10/4	Trickling filter Haul to land	Plans submitted for a new waste stabilization lagoon.
Beaman M-161	222	--	---	---	---	NEMTF	
Gladbrook WTP S-90	961	--	0.002/NA	---	---	None	Regeneration wastes from green sand filters.
Gladbrook M-162	961	--	0.098/0.106	26/21	15/12	Lagoon Not Applicable	
Four Mile Creek							

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type Sludge Disposal	Comments
			Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)		
Lincoln M-163	184	--	---	---	---	NEMTF	
Wolf Creek							
Traer M-164	1,700	--	0.141/0.173	49/58	25/29	Trickling filter Not Available	
Hickory Hills Homes of Tama S-91	--	--	---	---	---	Lagoon Not Applicable	
Hickory Hills Park Black Hawk CCB S-92	--	--	NA/0.052	---	---	Lagoon Not Applicable	
Cedar River							
Martin-Marietta Corp. - Smith Quarry I-99	--	--	.678/.678	---	---	None	Dewatering Quarry NW¼, Sec. 19, T86N, R12W.
B.L. Anderson Co. - Ballheim Quarry I-100	--	--	---	---	---	---	SE¼, Sec. 17, T86N, R12W.
LaPorte City WTP S-93	2,256	--	NA/.006	---	---	None	Filter backwash one per week.
LaPorte City M-165	2,256	--	.226/0.140	31/58	20/38	Trickling filter Not Available	
Oak Grove MHP S-94	--	--	---	---	---	---	
Spring Creek							
Jesup M-166	1,662	--	0.332/0.439	25/69	10/28	Contact stabilization Not Available	Infiltration problem reported during wet weather. Creamery discharge causes some shock loads.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Paul Nieman Const. Co. - Bloom Quarry I-101	--	--	---	---	---	3 cell lagoon Not Applicable	
Lime Creek							
Brandon M-167	432	--	0.024/0.029	26/5	10/2	Imhoff, sand filter Not Available	
Pratt Creek							
B.L. Anderson Co.- Jabens Quarry I-102	--	--	---	---	---	None	Dewatering Quarry NE$\frac{1}{4}$, Sec. 33, T86N, R11W.
Mt. Auburn M-168	200	210	.020/0.021	27/5	15/3	2 cell lagoon Not Applicable	
Hinkle Creek							
B.L. Anderson Co. - Garrison Quarry I-103	--	--	0.600/NA	---	---	Settling Basins Not Applicable	Aggregate washing SE$\frac{1}{4}$, Sec. 28, T85N, R11W.
Garrison M-170	383	560	.028/0.054	30/7	15/4	2 cell lagoon Not Applicable	6 surface acres.
Vinton WTP S-95	4,845	--	---	---	---	None	
Cedar River							
Vinton M-171	4,845	5,000	1.172/0.500	83/811	30/293	Trickling filter Not Available	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent: Flow (mgd) Average/Design	Effluent: BOD_5 (mg/l)/(lb/day)	Effluent: Ammonia-N (mg/l)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Mud Creek							
Benton County Home S-96	--	--	---	---	---	Septic tank Not Available	
B.L. Anderson Co. - Miller Quarry I-104	--	--	.015/NA	---	---	None	Dewatering Quarry NW$\frac{1}{4}$, Sec. 22, T85N, R10W.
Cedar River							
Urbana M-172	552	750	.055/0.075	30/14	15/7	2 cell lagoon Not Applicable	
Blue Creek							
Cono Christian School S-97	100	500	---	---	---	Lagoon Not Applicable	
Walker M-173	622	800	0.050/0.080	34/14	20/8	2 cell lagoon Not Applicable	
Center Point M-174	1,456	2,000	0.121/0.200	44/44	20/20	Spiragester, trickling filter Not Available	
Cedar River							
Iowa Electric Light & Power - Arnold Energy Center I-105	--	--	NA/0.020 NA/NA	30/NA ---	--- ---	Extended aeration None	Sanitary wastes. Cooling tower blowdown.
Bear Creek							
Shellsburg WTP S-98	740	--	NA/0.012	---	---	---	Discharge once per week.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Shellsburg M-175	740	825	.074/0.082	50/31	25/15	Imhoff, trickling filter Not Available	
B.L. Anderson Co. - Long Quarry I-106	--	--	NA/0.005	---	---	None	Dewatering Quarry
Little Bear Creek							
Newhall M-176	701	750	.035/0.055	31/9	20/6	2 cell lagoon Not Applicable	6 surface acres. Possibility of I/I problems reported.
Newhall WTP S-99	701	--	---	---	---	None	
Rollin Homes Country Manor - Phase II S-100	--	--	0.016/0.060	---	---	3 cell lagoon Not applicable	Total retention facility.
Dry Creek							
Atkins M-177	581	675	.037/0.085	35/11	20/6	Imhoff, trickling filter Drying beds	
Palo M-178	430	600	.043/0.060	60/22	30/11	Imhoff, trickling filter Not Available	
West Otter Creek							
B.L. Anderson Co. - Alice Quarry I-107	--	--	NA/0.015	---	---	None	Dewatering Quarry NW$\frac{1}{4}$, Sec. 8, T85N, R7W.
Robins M-179	663	--	---	---	---	NEMTF	

TABLE V-2
DISCHARGE INVENTORY

			Effluent			Treatment Type	
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD$_5$ (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Sludge Disposal	Comments
Hiawatha M-180	2,416	--	---	---	---	NEMTF	To Cedar Rapids STP
Cedar River							
Glen Oaks 1st Addition S-101	--	--	---	---	---	Lagoon Not Applicable	NE$\frac{1}{4}$, Sec. 15, T83N, R8W.
Lee Crawford Quarry I-108	--	--	NA/.155	---	---	None	Dewatering Quarry SE$\frac{1}{4}$, Sec. 23, T83N, R8W.
Cedar Rapids WTP S-102	110,642	--	.370/0.370	---	---	Lagoon Not Applicable	Backwash and lime softening sludge.
Collins Radio Group - "C" Avenue I-109	--	--	.013/NA .206/NA .036/NA	No Addition	No Addition	None	Cooling & Process water. Cooling & Process water. Cooling & Process water.
Weyerhaeuser Co. I-110	--	--	---	---	---	---	Truck wash.
Collins Radio Group - 35th Street I-111	--	--	.712/NA .600/NA	No Addition	No Addition	None	Cooling & Process water. Cooling & Process water.
Iowa Electric Light & Power - 6th Street Station I-112	--	--	1.15-2.02/NA 59-106/NA	---	---	None	Ash Ponds Cooling water from river. S-97° W-51°
Cargill - 6th Street Plant I-113	--	--	1.014/1.300	4/8	---	None	S-110° F.
Chicago Rock Island & Pacific R.R. I-114	--	--	NA/0.012	---	---	None	
King's Concrete I-115	--	--	NA/.005	---	---	None	Ready-mix truck wash water.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/1)/(lb/day)	Effluent Ammonia-N (mg/1)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Quaker Oats I-116	--	--	NA/2.265	Non Contact	Non Contact	None	Cooling water from river.
Cargill - 10th Avenue Plant I-117	--	--	0.679/NA	5/28	---	---	Cooling water 90° F. max.
Penick & Ford I-118	--	--	.58 .25 1.60	15/73 20/42 15/200	---	Well water River water River water	Cooling water & process water.
Wilson-Sinclair I-119	--	--	.1 .04	---	---	None	Storm. Storm and cooling.
Cargill - 16th Street Plant I-120	--	--	1.18/NA 1.36/NA	25/246 25/284	---	---	Cooling water and process water. (105° F.)
Cedar Rapids Main Plant M-181	110,642	--	25.535/21.58	94/20,018	55/11,713	Trickling filter Landfill	Design of new treatment facility in progress.
Martin-Marietta Corp. - Sand Plant I-121	--	--	NA/2.000	---	---	None	Aggregate washing SW$\frac{1}{4}$, Sec. 35, T82N, R7W.
Prairie Creek							
Keystone M-182	549	650	.047/0.065	27/11	15/6	2 cell lagoon Not Applicable	5 surface acres.
Van Horne M-183	613	600	.034/0.048	31/9	20/6	Imhoff, trickling filter Sludge beds	I/I problems reported.
Blairstown WTP S-103	612	--	---	---	---	None	Filter backwash 2 days per week.
Blairstown M-184	612	705	.033/0.065	34/9	20/6	2 cell lagoon Not Applicable	Locker plant discharges to system.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Norway M-185	554	724	.027/0.071	31/7	20/5	2 cell lagoon Not Applicable	6 surface acres.
Fairfax M-186	635	1,000	.064/0.050	27/14	15/8	1 cell lagoon Not Applicable	7 surface acres. Some I/I problems reported.
Chicago Northwestern R.R. Beverly Station I-122	--	--	NA/0.020	---	---	---	Car washing.
Waconia-Sorghum I-123	--	--	NA/1.72	---	---	---	Cooling & evaporator water.
W. R. Grace I-124	--	--	---	---	---	None	
Cherry Burrell I-125	--	--	NA/0.122	---	---	None	Effluent Limits: Flow - None, BOD - 20/mg/l NH_3-N - 2/mg/l
Prairie Creek							
Texaco, Inc. I-127	--	--	---	---	---	None	Storm water runoff.
Hubbard Feeds I-128	--	--	---	---	---	Septic tank Not Available	
St. Regis Paper I-129	--	--	NA/0.0001	---	---	---	
Lincoln Way Village S-104	--	470	NA/0.047	---	---	Lagoon Not Available	
Kirkwood Community College S-105	--	--	---	---	---	Activated sludge and trickling filter Not Available	Effluent discharges to Cedar Rapids STP.

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type Sludge Disposal	Comments
			Flow (mgd) Average/Design	BOD$_5$ (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)		
Iowa Electric Light & Power - Prairie Creek Station I-130	--	--	NA/70.38 NA/0.328	---	---	None Settling Pon	Cooling water. Ash settling pond.
Indian Creek							
Alburnett M-187	418	715	0.042/0.080	28/10	15/5	2 cell lagoon Not Applicable	
Linn County Home S-106	154	200	NA/.020	---	---	Lagoon Not Applicable	
Lehigh Portland Cement Company I-131	--	--	NA/0.0004	---	---	None	Truck wash rack one day per week.
Marion M-188	18,028	--	---	---	---	NEMTF	To Cedar Rapids STP.
Culligan Water Conditioning I-132	--	--	NA/0.004	---	---	None	Wastes from regeneration of water softeners.
Cedar River							
Kilborn Photo I-133	--	--	NA/0.007	---	---	None	Compressor cooling water.
Cedar Rapids Indian Creek Plant M-189	34,000	45,000	4.074/4.500	29/985	13/442	Trickling filter Lagoons	Plans for new treatment facility in progress.
Big Creek							
Springville M-190	970	852	.175/0.122	53/77	20/29	Imhoff, trickling Filter Not Available	I/I problems reported.

TABLE V-2
DISCHARGE INVENTORY

			Effluent				
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
DeWees-Potthoff - Bowser Quarry I-134	--	--	NA/0.050	---	---	None	Dewatering quarry aggregate washing. SW$\frac{1}{4}$, Sec. 29, T84N, R5W.
Carlton Mobile Home Court S-107	--	--	---	26/NA	---	1 cell lagoon Not Applicable	
DeWees-Potthoff - Dice Sand Pit I-135	--	--	NA/0.050	---	---	None	NW$\frac{1}{4}$, Sec. 36, T84N, R6W.
Elbow Creek							
Martelle M-191	341	--	---	---	---	NEMTF	Septic tanks with an effluent collection system.
Bertram M-192	177	--	---	---	---	NEMTF	
Cedar River							
Martin-Marietta Corp. - Stone Quarry I-136	--	--	NA/0.960	---	---	None	Dewatering quarry. SW$\frac{1}{4}$, Sec. 14, T82N, R6W.
Midwest Nameplate Co. I-137	--	--	---	---	---	Settling tanks, leaching field Not Available	
Spring Creek							
Lisbon M-193	1,343	1,700	.131/0.120	25/27	10/11	Extended aeration Not Available	
Mt. Vernon M-194	3,018	8,500	0.370/0.512	25/77	10/31	Trickling filter Not Available	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD$_5$ (mg/l)/(lb/day)	Effluent Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Rock Creek							
Stanwood M-195	642	750	.040/0.045	27/9	10/3	Imhoff, trickling filter Not Available	
R.L.D.S. Church Camp S-108	--	176	---	---	---	Lagoon Not Applicable	0.7 surface acres
Cedar County Home S-109	60	--	---	---	---	---	
Cedar River							
Martin-Marietta Corp. - Peden Quarry I-138	--	--	NA/2.000	---	---	None	Dewatering quarry. NE$\frac{1}{4}$, Sec. 9, T79N, R3W.
Home Oil Company S-110	--	415	NA/0.007	---	---	Lagoon Not Applicable	
Crooked Creek							
Tipton M-196	2,877	5,400	.322/0.500	25/67	10/27	Trickling filter Not Applicable	
Cedar Lake MHP S-111	--	118	NA/0.004	---	---	Lagoon Not Applicable	
Stuckey Camp Park S-112	--	--	---	---	---	---	
Cedar River Camping S-113	--	250	---	---	---	2 cell lagoon Not Applicable	
Cedar River							

TABLE V-2
DISCHARGE INVENTORY

			Effluent			Treatment Type	
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/1)/(lb/day)	Ammonia-N (mg/1)/(lb/day)	Sludge Disposal	Comments
I-80 Wheel S-114	--	--	---	---	---	Lagoon Not Applicable	
Wendling Quarries - Atalissa Quarry I-139	--	--	NA/0.030	---	---	None	Dewatering quarry. NW$\frac{1}{4}$, Sec. 8, T78N, R2W.
Sugar Creek							
Wendling Quarries I-140	--	--	NA/0.720	---	---	---	Dewatering quarry. NE$\frac{1}{4}$, Sec. 3, T79N, R2W.
Bennett M-197	385	500	.031/0.050	25/6	15/4	2 cell lagoon Not Applicable	
Iowa Highway Comm. I-80 (Wilton) North Side S-115	--	--	NA/0.001	---	---	Lagoon Not Applicable	
Iowa Highway Comm. I-80 (Wilton) South Side S-116	--	--	NA/0.001	---	---	Lagoon Not Applicable	
Skelly Oil Company S-117	--	60	NA/0.003	---	---	Lagoon Not Applicable	
Mud Creek							
Walcott M-198	989	5,000	.140/0.500	26/30	15/18	3 cell lagoon Not Applicable	
Stockton M-199	222	400	.019/0.040	31/5	20/3	2 cell lagoon Not Applicable	3 surface acres.
Durant M-200	1,472	3,100	.201/0.275	25/42	10/17	Trickling filter Drying beds	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent			Treatment Type Sludge Disposal	Comments
			Flow (mgd) Average/Design	BOD_5 (mg/l)/(lb/day)	Ammonia-N (mg/l)/(lb/day)		
Wilton WTP S-118	1,873	--	NA/.018	---	---	---	Filter backwash one day per week.
Wilton M-201	1,873	3,625	.295/.270	33/81	20/49	Spiragester, trickling filter Drying beds	I/I problems reported.
Wapsinonoc Creek							
Kampgrounds of Iowa S-119	--	--	NA/0.003	---	---	---	
Whittington Addition S-120	--	--	NA/0.020	---	---	Lagoon Not Applicable	
West Liberty M-202	2,296	4,390	.345/.540	30/86	10/29	Trickling filter Not Available	Existing plant overloaded. Design of new treatment facility in progress.
West Branch M-203	1,322	1,300	.132/.144	29/32	10/11	Imhoff, trickling filter Haul to land	Reported overloaded hydralically and organically.
Stuelke MHP S-121	--	--	---	---	---	---	
West Liberty WTP S-122	2,296	--	NA/0.020	---	---	None	Filter backwash 3 times per month.
Goshen Ditch							
Atalissa M-204	244	--	---	---	---	NEMTF	

TABLE V-2
DISCHARGE INVENTORY

			Effluent				
Discharger (Ref. No.)	1970 Pop.	Design P.E.	Flow (mgd) Average/Design	BOD_5 (mg/1)/(lb/day)	Ammonia-N (mg/1)/(lb/day)	Treatment Type Sludge Disposal	Comments
Big Slough							
Nichols M-205	396	500	.042/.040	30/10	15/5	2 cell lagoon Not Applicable	5 surface acres.
Iowa River							
Fredonia M-206	168	--	---	---	---	NEMTF	
Long Creek							
Ainsworth M-207	455	--	---	---	---	NEMTF	
River Products I-141	--	--	NA/0.030	---	---	None	NW$\frac{1}{4}$, Sec. 3, T74N, R5W.
Columbus City M-208	312	--	---	---	---	---	NEMTF
Natural Gas Pipeline - Cairo Gas Storage I-142	--	--	NA/.096	---	---	None	Groundwater pumping test.
Indian Creek							
Letts M-209	434	--	---	---	---	NEMTF	
Iowa River							
Grandview M-210	357	--	---	---	---	NEMTF	Proposed 3 cell lagoon Design .0616 mgd.
H.J. Heinz I-143	--	--	---	---	---	Lagoon Not Applicable	Domestic waste from migrant labor camp.
Louisa County Home S-123	--	60	---	---	---	Lagoon Not Applicable	
Wapello M-211	1,873	2,100	.187/0.210	25/39	15/23	2 cell lagoon Not Applicable	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	 BOD$_5$ (mg/l)/(lb/day)	 Ammonia-N (mg/l)/(lb/day)	Treatment Type Sludge Disposal	Comments
Otter Creek							
Morning Sun M-212	906	1,060	0.091/0.106	30/23	15/11	2 cell lagoon Not Applicable	8 surface acres.
Iowa River							
Oakville M-213	369	--	---	---	---	NEMTF	
Mississippi River							
Hawk[illegible]e Creek							
Mediapolis M-214	1,200	1,608	0.120/0.121	30/30	15/15	2 cell lagoon Not Applicable	10 surface acres.
Raid Quarries - Nelson Quarry I-144	--	--	NA/0.023	---	---	None	Dewatering quarry. SW$\frac{1}{4}$, Sec. 11, T72N, R2W.
Flint Creek							
Kaser Construction Co.-Mediapolis Quarry I-145	--	--	NA/0.370	---	---	None	Dewatering quarry.
U.S. Gypsum I-146	--	--	NA/0.045	---	---	2 cell lagoon Not Applicable	Mine dewatering and sanitary wastes. 2.3 surface acres.
Echo Valley MHP S-124	--	--	---	---	---	Lagoon Not Applicable	
Des Moines County Home S-125	200	--	---	---	---	Lagoon Not Applicable	
Burlington Northern R.R. I-147	--	--	NA/0.080	---	---	Lagoon Not Applicable	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent Flow (mgd) Average/Design	Effluent BOD_5 (mg/1)/(lb/day)	Effluent Ammonia-N (mg/1)/(lb/day)	Treatment Type Sludge Disposal	Comments
TRW/IRC Fixed Resistors I-149	--	--	NA/0.040	---	---	None	Cooling water.
Rutherford Potato I-150	--	--	NA/0.20	---	---	None	Potato wash water.
Green Acres MHP S-126	--	--	---	---	---	Lagoon Not Applicable	
Burlington WTP S-127	32,400	--	---	---	---	3 cell lagoon Not Applicable	Filter backwash and lime sludge settling. 12 surface acres.
J.I. Case I-151	--	--	NA/0.120	---	---	Settling pond	
Mississippi River							
Texaco, Inc. S-128	--	--	---	---	---	None	Storm water runoff.
Midwest Mfg. I-148	--	--	NA/0.476	---	---	---	Cooling water and process water containing oil and grease.
Riley Bros., Inc. I-152	--	--	---	---	---	---	
Burlington M-215	32,400	42,000	3.240/8.500	49/1,324	25/676	Primary settling Not Available	
American Oil I-153	--	--	NA/0.022	---	---	None	
Iowa Southern Utilities I-154	--	--	NA/0.675 NA/0.001 NA/0.36 NA/114.3	---	---	None	Cooling water.
Spring Grove MHP S-129	--	--	---	---	---	---	

TABLE V-2
DISCHARGE INVENTORY

Discharger (Ref. No.)	1970 Pop.	Design P.E.	Effluent: Flow (mgd) Average/Design	Effluent: BOD_5 (mg/l)/(lb/day)	Effluent: Ammonia-N (mg/l)/(lb/day)	Treatment Type / Sludge Disposal	Comments
Plantation Village MHP S-130	--	--	---	---	---	Lagoon Not Applicable	
Spring Creek							
West Burlington M-216	3, 100	4,000	0.451/0.400	27/102	10/38	Imhoff, trickling filter Not Available	
Spring Lake Camp Grounds S-131	--	--	---	---	---	Lagoon Not Applicable	

** Abbreviations used include:

Ammonia-N = Ammonia-Nitrogen
BOD_5 = Five Day Biochemical Oxygen Demand
cfs = Cubic feet per second
COD = Chemical Oxygen Demand
D.D. = Drainage Ditch
D.T. = Detention Time
gal. = gallons
lbs. = pounds
mgd = million gallons per day
mg/l = milligrams per liter
MHP = Mobile Home Park
NA = Not Available
NEMTF = No Existing Municipal Treatment Facility
P.E. = Population Equivalent
Pop. = Population
R. = Range
Ref. No. = Reference Number
S.D. = Sanitary District
Sec. = Section
S.S. = Suspended Solids
STP = Sewage Treatment Plant
T = Township
WTP = Water Treatment Plant

TABLE V-3

IOWA-CEDAR RIVER BASIN
POINT SOURCE
WASTEWATER DISCHARGE SUMMARY

	Municipal	Semipublic	Industrial
Iowa River above Marshalltown			
Flow (mgd)	2.232	.056	1.844
% Total flow	54	1	45
BOD_5 (lbs/day)	610	10	--
% Total BOD_5	98	2	--
Ammonia-N (lbs/day)	299	6	--
% Total Ammonia-N	98	2	--
Iowa River above Coralville Reservoir Dam			
Flow (mgd)	5.630	.026	2.544
% Total flow	68	1	31
BOD_5 (lbs/day)	1,297	--	133
% Total BOD_5	91	--	9
Ammonia-N (lbs/day)	533	--	50
% Total Ammonia-N	91	--	9
Iowa River above Mouth			
Flow (mgd)	8.066	.037	--
% Total flow	99.5	.5	--
BOD_5 (lbs/day)	1,829	--	--
% Total BOD_5	100	--	--
Ammonia-N (lbs/day)	828	--	--
% Ammonia-N	100	--	--

TABLE V-3 (CONTINUED)

	Municipal	Semipublic	Industrial
English River			
Flow (mgd)	.915	--	--
% Total flow	100	--	--
BOD_5 (lbs/day)	217	--	--
% Total BOD_5	100	--	--
Ammonia-N (lbs/day)	114	--	--
% Total Ammonia-N	100	--	--
Shell Rock River			
Flow (mgd)	.886	--	--
% Total flow	100	--	--
BOD_5 (lbs/day)	396	--	--
% Total BOD_5	100	--	--
Ammonia-N (lbs/day)	118	--	--
% Total Ammonia-N	100	--	--
Winnebago River			
Flow (mgd)	5.642	--	--
% Total flow	35	--	65
BOD_5 (lbs/day)	1,283	--	480
% Total BOD_5	72	--	28
Ammonia-N (lbs/day)	437	--	--
% Total Ammonia-N	100	--	--
West Fork Cedar River			
Flow (mgd)	2.987	.063	--
% Total flow	98	2	--
BOD_5 (lbs/day)	705	--	--
% Total BOD_5	100	--	--
Ammonia-N (lbs/day)	269	--	--
% Total Ammonia-N	100	--	--

TABLE V-3 (CONTINUED

	Municipal	Semipublic	Industrial
Cedar River above Cedar Falls			
Flow (mgd)	3.592	--	.028
% Total flow	99	--	1
BOD_5 (lbs/day)	1,595	--	--
% Total BOD_5	100	--	--
Ammonia-N (lbs/day)	1,328	--	--
% Total Ammonia-N	100	--	--
Cedar River above Cedar Rapids			
Flow (mgd)	22.168	.028	146.890
% Total flow	13	.5	86.5
BOD_5 (lbs/day)	9,013	--	814
% Total BOD_5	92	--	8
Ammonia-N (lbs/day)	3,911	--	--
% Total Ammonia-N	100	--	--
Cedar River above Mouth			
Flow (mgd)	32.581	0.370	1.567
% Total flow	95	1	4
BOD_5 (lbs/day)	21,891	--	--
% Total BOD_5	100	--	--
Ammonia-N (lbs/day)	12,432	--	--
% Total Ammonia-N	100	--	--
Mississippi River			
Flow (mgd)	3,811	--	--
% Total flow	100	--	--
BOD_5 (lbs/day)	1,456	--	--
% Total BOD_5	100	--	--
Ammonia-N (lbs/day)	729	--	--
% Total Ammonia-N	100	--	--

TABLE V-4

MUNICIPAL WASTEWATER TREATMENT FACILITY PROCESS SUMMARY BY SUBBASIN

Type of Plant	No. of Communities	Population Served
Iowa River above Marshalltown		
Two Cell Lagoon	10	5,556
Trickling Filter	5	12,371
Imhoff-Trickling Filter	1	777
Total		18,704
No Treatment	8	1,642
Iowa River above Coralville Reservoir Dam		
One Cell Lagoon	1	275
Two Cell Lagoon	9	5,144
Trickling Filter	2	3,632
Imhoff-Trickling Filter	5	7,412
Septic Tank	2	201
Activated Sludge	4	30,685
Total		47,349
No Treatment	10	1,566
Iowa River above Mouth		
Two Cell Lagoon	1	626
Three Cell Lagoon	1	208
Trickling Filter	1	46,850
Imhoff-Trickling Filter	1	666
Activated Sludge	4	8,538
Total		56,888
No Treatment	1	50

TABLE V-4 (CONTINUED)

Type of Plant	No. of Communities	Population Served
English River		
Three Cell Lagoon	1	1,488
Trickling Filter	2	2,023
Total		3,511
No Treatment	8	1,431
Shell Rock River		
Two Cell Lagoon	2	1,755
Trickling Filter	2	2,496
Imhoff-Trickling Filter	1	1,363
Septic Tank	1	1,360
Rapid Sand Filter	1	1,950
Total		8,924
No Treatment	4	981
Winnebago River		
Two Cell Lagoon	2	1,503
Trickling Filter	2	4,685
Activated Sludge	1	31,839
Total		38,027
No Treatment	4	1,700
West Fork Cedar River		
Two Cell Lagoon	4	3,275
Trickling Filter	2	11,242
Rapid Sand Filter	1	942
Total		15,559
No Treatment	7	1,585

TABLE V-4 (CONTINUED)

Type of Plant	No. of Communities	Population Served
Cedar River above Cedar Falls		
Two Cell Lagoon	9	8,139
Trickling Filter	4	24,665
Imhoff Tank	4	3,807
Septic Tank	2	1,561
Rapid Sand Filter	1	942
Total		39,114
No Treatment	15	3,156
Cedar River above Cedar Rapids		
Single Cell Lagoon	1	200
Two Cell Lagoon	6	4,394
Three Cell Lagoon	1	258
Trickling Filter	9	123,933
Imhoff Tank	6	3,894
Activated Sludge	2	6,700
Total		139,379
No Treatment	4	1,595
Cedar River above Mouth		
Single Cell Lagoon	1	635
Two Cell Lagoon	10	7,258
Three Cell Lagoon	1	989
Trickling Filter	7	156,178
Imhoff-Trickling Filter	4	2,947
Total		168,007
No Treatment	9	20,451

TABLE V-4 (CONTINUED)

Type of Plant	No. of Communities	Population Served
Mississippi River		
Two Cell Lagoon	1	1,200
Primary Settling	1	32,400
Imhoff-Trickling Filter	1	3,100
Total		36,700

TABLE V-5

IOWA-CEDAR RIVER BASIN
MUNICIPAL WASTEWATER TREATMENT
FACILITY PROCESS SUMMARY

Type of Plant	Communities Served	Population Served
Trickling Filter	36	386,052
Activated Sludge	11	77,762
Single Cell Lagoon	3	1,109
Two Cell Lagoon	54	38,850
Three Cell Lagoon	4	989
Four Cell Lagoon		
Septic Tank	5	3,122
Imhoff Tank	22	23,966
Rapid Sand Filter	1	942
Primary Settling	1	32,400
Total	137	565,193
NEMTF*	70	34,157

*No Existing Municipal Treatment Facilities

REFERENCES

1. An Inventory of Water Resources and Water Problems, Iowa-Cedar River Basin, Iowa, Prepared by the Iowa Natural Resources Council, 1955.

2. R. H. Shaw and P. J. Waite, The Climate of Iowa, III-Monthly, Crop Season and Annual Temperature and Precipitation Normals for Iowa, Agricultural and Home Economics Experiment Station, Iowa State University of Science and Technology, Ames, Iowa, April 1964.

3. Ivan L. Burnmeisler, The Streamflow Data Program in Iowa, U. S. Department of Interior, Geological Survey, Water Resources Division, Iowa City, Iowa, 1970.

4. Water Resources of Iowa, Ed. Paul J. Horick, University Printing Service, Iowa City, Iowa, January, 1970.

5. Low Flow Characteristics of Iowa Streams Through 1966, Albert J. Heinitz, Prepared by the U. S. Geological Survey, Water Resources Division, in cooperation with the Iowa Natural Resources Council, State of Iowa, 1970.

CHAPTER VI

WASTELOAD ALLOCATIONS AND RANKINGS

WASTE LOAD ALLOCATIONS

Using a computer methodology, effluent limitations required for dischargers to meet state water quality standards within the basin were determined. Waste load allocation analyses were performed assuming projected 1990 wastewater discharges at the 7-day, 1-in-10 year low flow under both summer and winter conditions. Analyses were performed on streams classified either A, B, or C with existing wastewater discharges. Some considerations that went into the analysis are discussed below. (A detailed description of the computer methodology and the assumptions used can be found in the Supporting Document for Iowa Water Quality Management Plans.) Immediately following this discussion, the summer and winter waste load allocations are listed in Table VI-1. The effluent limitations for all dischargers in the Iowa-Cedar River Basin not appearing in Table VI-1 are either secondary treatment or BPT.

The theoretical concentrations of dissolved oxygen and ammonia in the stream which result from the waste load allocations, have been plotted for certain segments and are shown in Figures VI-1 through VI-14.

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^{d} (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^{d} (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Iowa River						
East Branch Iowa River						
Northern Natural Gas I-1		0.043^{d}	b	b	b	b
Farmland Industries I-2		Discharge Ceased				
Welp & McCarten - Reuber Quarry I-3		1.000^{d}	c	c	c	c
Garner M-2		0	Controlled Discharge			
Klemme M-3		0	Controlled Discharge			
Iowa River						
Belmond M-5	3.438	0.321	22.5/60	2/5	22.5/60	2/5
U.S. Steel Corp. I-4	3.438	0.250^{d}	b	b	b	b
Central Soya I-5	3.438	0.216	15/27	2/4	15/27	2/4
Weaver Const. Co. - Dows Quarry I-6		0.720^{d}	c	c	c	c
Dows M-8	3.955	0.085	15/11	2/1	15/11	2/1
Iowa Limestone Company I-7		0.008^{d}	c	c	c	c
Alden M-10	4.505	0	Controlled Discharge			
Weaver Construction Company Alden Quarry I-8		0.002^{d}	c	c	c	c

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Soft Water Service I-9	5.73	.022[d]	b	b	b	b
Ralston Purina I-10	5.73	1.534[d]	b	b	b	b
Iowa Falls M-11	5.73	1.240	15/155	4/41	45/465	6/62
Iowa Electric Light & Power I-11	6.00	10.247	b	b	b	b
Farmland Foods I-12	6.00	0	Controlled Discharge			
Steamboat Rock M-12	6.46	0.019	45/7	10/2	45/7	15/2
Eldora M-13	7.20	0.35	45/131	10/29	45/131	8/23
Beaver Creek						
Eldora Reformatory M-14		.199	45/75	10/17	45/75	15/25
South Fork Iowa River						
Williams M-15		0	Controlled Discharge			
Iowa River						
Union M-18		0	Controlled Discharge			
Liscomb M-20		0	Controlled Discharge			
Honey Creek						
Raddcliffe M-21		0	Controlled Discharge			
Hubbard M-22		0	Controlled Discharge			
Middle Minerva Creek						
Zearing M-24		0	Controlled Discharge			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^a (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^a (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Clemons M-26		0	Controlled Discharge			
Chicken Creek						
Albion M-27		0	Controlled Discharge			
Iowa River						
Culligan Soft Water Service I-13		0.013	b	b	b	b
Marshalltown M-28	13.98	5.217	15/653	2/87	20/871	3/131
Linn Creek						
Fisher Control Co. - Center Street Facility I-14		0.660	5/28^d	0.1/0.7^d	5/28^d	0.1/0.7^d
Fisher Control Co. - General Building I-15		0.002	5/-^{d}	1.3/0.2^d	5/-^{d}	1.3/0.2^d
Swift Fresh Meats I-16		0.120	b	b	b	b
Lennox Industries I-17		No Discharge Data Available				
Fisher Control Co. - Governor Road I-18		0.068	5/3^d	0.6/0.8^d	5/3^d	0.6/0.8^d
Kiowa Corporation I-19		0.477^d	b	b	b	b
Iowa River						
Iowa Electric Light & Power Co. I-20		0.388^d	b	b	b	b

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Central Iowa Rendering I-21		0.021	10/2	20/4	10/2	20/4
Martin-Marietta Corp. - Marshalltown Sand Plant I-22		0.070[d]	c	c	c	c
North Timber Creek						
State Center M-29		0.207	45/78	10/17	45/78	15/26
Brush Creek						
Gilman M-31		0	Controlled Discharge			
Martin-Marietta Corp. - Ferguson Quarry I-23		NA	c	c	c	c
Iowa River						
LeGrand M-33		0	Controlled Discharge			
Montour M-34		0	Controlled Discharge			
Deer Creek						
Garwin M-35		0.066	45/25	10/6	45/25	15/8
Toledo M-36		0.300	45/113	10/25	45/113	15/38
Iowa River						
Packaging Corp. of America I-24	24.73	0.55	100/459	10/46	30/138	4/8
Tama M-37	25.29	0.355	45/133	10/30	45/133	15/44

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD[a] (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD[a] (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/day)
Tama Meat Packing Corp. I-25	25.29	0	Controlled Discharge			
Salt Creek						
Clutier M-39		0	Controlled Discharge			
Dysart M-40		0.226	45/85	10/19	45/85	15/28
Iowa River						
Belle Plaine M-43	27.93	0.174	45/65	10/15	45/65	15/22
Bear Creek						
Malcom Stone Co. I-26		0.384[d]	c	c	c	c
Little Bear Creek						
Lang Farms I-27			b	b	b	b
Malcom M-47		0	Controlled Discharge			
Brooklyn M-48	0.00	0.103	3/3	1/1	6/5	2/2
Bear Creek						
Victor M-49	0.10	0.078	3/2	1/1	6/4	2/1
Ladora M-50		0	Controlled Discharge			
Iowa River						
Hallett Construction Co. I-28		0.002[d]	c	c	c	c

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Marengo M-51		0	Controlled Discharge			
Amana Refrigeration I-29		0.900[d]	15/112[d]	0.5/3.4[d]	15/112[d]	0.5/3.4[d]
Homestead S.D. M-53		0	Controlled Discharge			
Amana S.D. M-54		0	Controlled Discharge			
Amana Woolen Mills I-30		0.055[d]	e	e	e	e
Knapp Creek						
Martin-Marietta Corp. - Crozier Quarry I-31		0.531[d]	c	c	c	c
Swisher Creek						
Swisher M-56		0.065	45/24	10/5	45/24	15/8
Iowa River						
Data Processing I-32			b	b	b	b
Hoosier Creek						
Ely M-57		0	Controlled Discharge			
Mill Creek						
Solon M-59		0.134	45/50	10/11	45/50	15/17
Rapid Creek						
Iowa City Westinghouse M-60		0	Controlled Discharge			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^a (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^a (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Muddy Creek						
North Liberty M-61		0.38	45/42	10/32	45/142	15/47
Iowa River						
River Products I-33		0.480^d	c	c	c	c
Clear Creek						
Amana Nordstrom Holiday Inn S-38		0	Controlled Discharge			
Buck Hummer Trucking I-34			b	b	b	b
Oxford M-62		0.116	45/44	10/10	45/44	15/15
Tiffin M-63		0.052	45/20	10/4	45/20	15/7
Allied Mills I-35		0.005	b	b	b	b
Martin-Marietta Corp. - Klein Quarry I-36		0.223	c	c	c	c
Ralston Creek						
Culligan Water I-37		0.020^d	b	b	b	b
Iowa River						
Coralville M-64		2.650	45/995	10/221	45/995	15/332
Iowa City Main Plant M-65	105.004	10.577	27/2382	7/618	45/3970	13/1147
Proctor & Gamble I-38			b	b	b	b
Hills M-66	119.688	0.090	45/34	10/8	45/34	15/11

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD^a (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD$^{a/}$ (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l) /(lbs/day)
Old Mans Creek						
Williamsburg M-67		0.242	15/30	2/4	15/30	2/4
Iowa River						
Lone Tree - North M-68 Lone Tree - South M-69		0	Controlled Discharge			
Middle English River						
North English M-73		0.118	15/15	2/2	22/22	5/5
South English River						
Kaser Construction Company - Keswick Quarry I-39		0.110^d	c	c	c	c
Smith Creek						
Wellman M-79		0.169	15/21	2/3	22/32	5/7
English River Ramsey Creek						
Twin County Dairy I-40		0.015^d	30/3.8	0/0	30/3.8	0/0
English River						
Kalona M-80		0	Controlled Discharge			
Riverside M-81		0.103	15/13	2/2	22/19	5/4
Honey Creek						
Conesville M-82		0	Controlled Discharge			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD[a] (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD[a] (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/day)
Iowa River						
Natural Gas Pipeline Co. Columbus City I-41		0.150[d]	b	b	b	b
Rath Packing Co. I-42	140.053	0.600[d]	-/109[b]	b	-/109[b]	b
Columbus Junction M-84		0	Controlled Discharge			
Cedar River						
St. Ansgar M-86		0	Controlled Discharge			
Sugar Creek						
Osage M-88	18.46	0.340	45/128	10/28	45/128	15/43
Cedar River						
Kark Rendering I-43			Plant to be closed in 1975			
Spring Creek						
Orchard M-89		0.11[d]	45/4	10/1	45/4	15/1
Cedar River						
Floyd M-91		0	Controlled Discharge			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Cedar River						
Salsbury Laboratory I-44		0.050[d]	b	b	b	b
Charles City M-92	24.44	1.823	45/684	10/152	45/684	15/228
Farmers CO-OP Creamery I-45		0.015[d]	b	b	b	b
Nashua M-93	27.56	0.135	45/51	10/11	45/51	15/17
Little Cedar River						
Stacyville M-94	0.78	0.027	45/10	10/2	45/10	15/4
Martin-Marietta Corp. - Boice Quarry I-46		0.100	c	c	c	c
Martin-Marietta Corp. - Boever Pit I-47		0.050	c	c	c	c
Martin-Marietta Corp. - Ernivine Quarry I-48		0.050	c	c	c	c
Plainfield M-97		0	Controlled Discharge			
Carnation Co. I-49		0.180	b	b	b	b
Waverly M-98	30.32	0.665	45/250	10/55	45/250	15/83
Quarter Section Run						
Denver M-99		0	Controlled Discharge			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^a (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^a (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Cedar River						
Janesville M-100	32.62	.165	45/62	10/14	45/62	15/21
W. Frk. Cedar River						
Beaver Dam Creek						
Clear Lake S.D. M-133	0.00	2.153	20/259	5/90	3/54	2/36
Welp & McCarten, Inc. Swaledale Quarry I-50		2.500	c	c	c	c
Rockwell M-102	2.62	0.097	45/36	10/8	45/36	15/12
Bailey Creek						
Thornton M-103		0	Controlled Discharge			
Sheffield M-105		0	Controlled Discharge			
W. Frk. Cedar River						
Dumont M-106		0	Controlled Discharge			
Squaw Creek						
Hampton M-110	0.933	0.425	45/160	9/32	45/160	5/18

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD^a (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD^a (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/cay)
Maynes Creek						
Weaver Construction Co. Hibness Quarry I-51		2.400^d	c	c	c	c
Hallett Construction Co. I-52		1.500^d	c	c	c	c
Greene Limestone Co. Burns Quarry I-53		0.750^d	c	c	c	c
W. Frk. Cedar River						
Allison M-115		0	Controlled Discharge			
Martin-Marietta Corp. Yokom Quarry I-54		1.030^d	c	c	c	c
Shell Rock River						
Northwood M-116	5.11	0.31	45/116	10/26	45/116	15/39
Welp & McCarten, Inc. Kuemen Quarry I-55		1.500^d	c	c	c	c
Martin-Marietta Corp. Randall Quarry I-56		0.480	c	c	c	c
Rose Creek						
Manly M-118		0	Controlled Discharge			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Rose Creek						
Chicago, Rock Island & Pacific Railroad I-57		0.189[d]	b	b	b	b
Shell Rock River						
Nora Springs M-121		0.209	45/78	10/17	45/78	15/26
Rockford M-122		0	Controlled Discharge			
Winnebago River						
Leland M-125		0	Controlled Discharge			
Forest City (E) M-126 Forest City (SW) M-127	0.15	0.700	3/18	1/6	3/18	2/12
Beaver Creek						
Lake Mills M-128	0.00	0.158	15/20	6/8	18/24	3/3
Walker Mfg. I-58		0.023[d]	b	b	b	b
Winnebago River						
Welp & McCarten, Inc. Stricker Quarry I-59		6.000[d]	c	c	c	c
P & M Stone Co. Wepking Quarry I-60		0.050[d]	c	c	c	c

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Winnebago River						
Weaver Ready Mix Quimby Quarry I-61			c	c	c	c
Lehigh Portland Cement Company I-62		18.310[d] 2.516[d]	b c	b c	b c	b c
Northwestern States Portland Cement Co. I-63		0.600[d] 3.370[d]	b c	b c	b c	b c
Weaver Construction Co. Mason City Sand Plant I-64		0.700[d]	c	c	c	c
Armour & Company I-65		0.640[d]	e	e	e	e
Willow Creek						
Allied Mills I-66		0.026[d]	8/2	3/1	15/4	3/1
Libby Owens Ford I-67		0.058[d]	e	e	e	e
Soft Water Service, Inc. I-68		0.056[d]	b	b	b	b
Interstate Power Co. I-69		8.500[d]	b	b	b	b
Chicago, Milwaukee, St. Paul & Pacific Railroad I-70		0.001[d]	b	b	b	b
Winnebago River						
Mason City M-134	3.48	6.510	8/407	3/163	15/814	3/136

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD[a] (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD[a] (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/day)
Hebel Fertilizer & Chemical Company I-71			b	b	b	b
Martin-Marietta Corp. - Portland Quarry I-72		0.710[d]	c	c	c	c
Greene Limestone Company - Portland Quarry I-73		0.900[d]	c	c	c	c
Shell Rock River						
Marble Rock M-135		0	Controlled Discharge			
Greene M-136	17.61	0.116	45/44	10/10	45/44	15/15
Greene Rendering Co. I-74		0.030[d]	b	b	b	b
Coldwater Creek						
Greene Limestone Co. Lubben Quarry I-75		0.900[d]	c	c	c	c
Shell Rock River						
Clarksville M-139		.176	45/66	10/15	45/66	15/22
Shell Rock M-140	36.43	0.097	45/36	10/8	45/36	15/12
Beaver Creek						
Ackley Food Processors, Inc. I-76	0.19	0.028[d]	No net increase, non-contact cooling water[d]			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD$^{a/}$ (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD$^{a/}$ (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Aplington M-142	0.87	0.062	45/23	10/5	45/23	15/8
S. Frk. Beaver Creek						
Wellsburg M-143	0.34	0.045	45/17	10/4	45/17	15/6
Ackley M-141	1.00	0.212	45/80	10/18	45/80	5/9
Beaver Creek						
Parkersburg M-144		0	Controlled Discharge			
New Hartford M-146		0	Controlled Discharge			
Cedar River						
Clay Equipment Co. I-77			b	b	b	b
Dry Run Creek						
Cedar Falls Utilities I-78		5.400^{d}	b	b	b	b
Cedar River						
Viking Pump Co., Division Houdaille, Ind. I-79		0.033^{d}	b	b	b	b
Cedar Falls Main Plant M-147	115.68	5.365	45/2.013	10/447	45/2.013	15/671
Cedar Falls - Cedar Hts. STP M-148		0.050	45/19	10/4	45/19	15/6

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^a (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^a (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Cedar River						
Waterloo Industries I-80		0.080^d	b	b	b	b
John Deere & Co. I-81	118.0	37.48^d	b	b	b	b
Pepsi Cola Bottling Co. I-82		0.017	45/6	10/1	45/6	7/1
Engineered Equipment I-83		0.004^d	b	b	b	b
Black Hawk Creek						
Holland M-149		0	Controlled Discharge			
Mid Equipment Co. I-84			b	b	b	b
Grundy Center M-150	0.31	0.472	3/12	2/8	3/12	3/12
Reinbeck M-152	1.00	0.300	3/8	2/5	3/8	4/9
Reinbeck Canning Co. I-85			Discharges cooling water only			
N. Black Hawk Creek						
Dike M-153	1.38	0.094	45/35	10/8	45/35	15/12
Black Hawk Creek						
Northern Natural Gas Co. I-86		7.050	b	b	b	b
M.V.M.P.A. I-87		0.675^d	b	b	b	b

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD^a (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD^a (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/day)
Hudson M-154	1.99	0.286	45/107	10/24	45/107	5/12
Deere & Co. I-88			b	b	b	b
Cedar River						
C. W. Shirey Co. I-89		0.010^d	b	b	b	b
Virden Creek						
Chamberlain Mfg. Co. I-90		1.00*	b	b	b	b
Iowa Public Service Co. I-91		89.302^d*	b	b	b	b
Cedar River						
Construction Machinery Co. I-92		0.005^d	b	b	b	b
Rath Packing Co. I-93		5.1	No net increase^d			
Waterloo M-155	155.8	21.720	22.5/4,076	5/906	15/2,717	2/362
Evansdale M-156	183.05	0.562	45/211	10/47	45/211	15/70
Elk Run						
Elk Run Hts. M-157		0.150	45/56	10/13	45/56	15/19
Martin-Marietta Corp. - Morgan Quarry I-94		1.128^d	c	c	c	c

*Surface water

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^{a} (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^{a} (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Cedar River						
Martin-Marietta Corp. - O'Connell Sand Pit I-95		0.500^{d}	c	c	c	c
Poyner Creek						
Welp & McCarten, Inc. Pint Quarry I-96		1.000^{d}	c	c	c	c
Miller Creek						
Martin-Marietta Corp. Waterloo Quarry I-97		0.540^{d}	c	c	c	c
Welp & McCarten, Inc. Newton Quarry I-98		7.000^{d}	c	c	c	c
Wolf Creek						
Conrad M-160	0.16	0.058	6/3	5/2	45/22	5/2
Gladbrook M-162		0	Controlled Discharge			
Traer M-164	0.89	0.155	45/58	10/13	45/58	9/12
Martin-Marietta Corp. Smith Quarry I-99		0.678^{d}	c	c	c	c
B. L. Anderson Co. Ballheim Quarry I-100			c	c	c	c
LaPorte City M-165	1.86	0.271	45/102	10/23	45/102	9/20

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD^a (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD^a (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/day)
Spring Creek						
Jesup M-166	0.00	0.327	9/25	5/12	1/3	1/3
Paul Neiman Construction Co. Bloom Quarry I-101			c	c	c	c
Lime Creek						
Brandon M-167		0.054	45/20	10/5	45/20	15/7
Pratt Creek						
B. L. Anderson Co. Jabens Quarry I-102			c	c	c	c
Mt. Auburn M-168		0	Controlled Discharge			
Rowley M-169		0	Controlled Discharge			
Hinkle Creek						
B. L. Anderson Co. Garrison Quarry I-103		0.600^d	c	c	c	c
Garrison M-170		0	Controlled Discharge			
Cedar River						
Vinton M-171	192.01	1.171	45/439	10/98	45/439	15/147
Mud Creek						
B. L. Anderson Co. Miller Quarry I-104		0.015	c	c	c	c

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^a (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^a (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Cedar River						
Urbana M-172		0	Controlled Discharge			
Blue Creek						
Walker M-173		0	Controlled Discharge			
Center Point M-174		0.248	45/93	10/21	45/93	15/31
Cedar River						
Ia. Electric Light & Power Co. Arnold Energy Center I-105	198.99	0.02	45/5	2/2.5	45/5	2/2.5
Bear Creek						
Shellsburg M-175		0.095	45/36	10/8	45/36	15/12
B. L. Anderson Co. Long Quarry I-106		0.005	c	c	c	c
Little Bear Creek						
Newhall M-176		0	Controlled Discharge			
Dry Creek						
Atkins M-177		0.075	45/28	10/6	45/28	15/9
Palo M-178		0.073	45/27	10/6	45/27	15/9

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
W. Otter Creek						
B. L. Anderson Co. Alice Quarry I-107		0.015[d]	c	c	c	c
Cedar River						
Lee Crawford Quarry I-108		0.155[d]	c	c	c	c
Collins Radio Group-C Ave. I-109		0.255[d]	b	b	b	b
Weyerhaeuser Co. I-110			b	b	b	b
Collins Radio Group-35th St. I-111		1.312[d]	b	b	b	b
Ia. Electric Light & Power Co. 6th St. Station I-112	203.03	60.000[d]	b	b	b	b
Cargill-6th St. Plant I-113	203.03	1.300[d]	4/8[d]	b	4/8[d]	b
Chicago, Rock Island & Pacific Railroad I-114		0.012[d]	b	b	b	b
King's Concrete I-115		0.005[d]	b	b	b	b
Quaker Oats I-116		2.265[d]	No net increase			
Cargill-10th Ave. Plant I-117	205.44	0.679[d]	b	b	b	b
Penick & Ford I-118	206.24	2.180[d]	b	b	b	b
Wilson - Sinclair I-119	207.00	0.14	Storm water runoff and cooling water[d]			

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Cargill-16th St. Plant I-120	207.58	2.540[d]	b	b	b	b
Cedar Rapids Main Plant M-181 Indian Creek Plant M-189	213.21	39.522	45/14,833	10/3,296	45/14,833	5/1,648
Martin-Marietta Corp. Sand Plant I-121		2.000[d]	c	c	c	c
Prairie Creek						
Keystone M-182		0	Controlled Discharge			
Van Horne M-183	0.08	.079	15/10	2/1	15/10	2/1
Blairstown M-184		0	Controlled Discharge			
Norway M-185		0	Controlled Discharge			
Fairfax M-186		0	Controlled Discharge			
Chicago-Northwestern R.R. - Beverly Station I-122	1.23	0.020[d]	30/5	0/0	30/5	0/0
Waconia Sorghum I-123	1.88	1.720[d]	b	b	b	b
W. R. Grace I-124	1.88		b	b	b	b
Cherry Burrell I-125	1.88	0.122[d]	30/20	2/2	30/20	2/2
Square D I-126	1.88	0.045	b	b	b	b
Texaco, Inc. I-127	1.88		b	b	b	b

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD[a] (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD[a] (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/day)
Hubbard Feeds I-128			b	b	b	b
St. Regis Paper I-129		0.0001[d]	b	b	b	b
Iowa Electric Light & Power Prairie Creek Station I-130		70.708[d]	b	b	b	b
Indian Creek						
Alburnett M-187		0	Controlled Discharge			
Lehigh Portland Cement Co. I-131		0.0004[d]	b	b	b	b
Culligan Water Conditioning I-132		0.004[d]	b	b	b	b
Kilborn Photo I-133		0.007[d]	b	b	b	b
Big Creek						
Springville M-190	0.175	0.168	45/63	10/14	45/63	15/21
Dewees-Potthoff Bowser Quarry I-134		0.050[d]	c	c	c	c
Dewees-Potthoff Dice Sand Pit I-135		0.050[d]	c	c	c	c

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer Ultimate BOD^a (mg/l)/lbs/day)	Summer Ammonia-N (mg/l)/(lbs/day)	Winter Ultimate BOD^a (mg/l)/(lbs/day)	Winter Ammonia-N (mg/l)/(lbs/day)
Cedar River						
Martin-Marietta Corp. Stone Quarry I-136		0.960^d	c	c	c	c
Midwest Nameplate Co. I-137			b	b	b	b
Spring Creek						
Lisbon M-193		0.229	45/86	10/19	45/86	15/29
Mt. Vernon M-194		0.609	45/229	10/51	45/229	15/76
Rock Creek						
Stanwood M-195		0.085	45/32	10/7	45/32	15/11
Cedar River						
Martin-Marietta Corp. Peden Quarry I-138		2.000	c	c	c	c
Crooked Creek						
Tipton M-196		0.417	45/156	10/35	45/156	15/52
Cedar River						
Wendling Quarries Atalissa Quarry I-139		0.030^d	c	c	c	c

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Sugar Creek						
Wendling Quarries I-140		0.720[d]	c	c	c	c
Bennett M-197		0	Controlled Discharge			
Mud Creek						
Walcott M-198		0	Controlled Discharge			
Stockton M-199		0	Controlled Discharge			
Durant M-200		0.247	45/93	10/21	45/93	15/31
Wilton M-201		0.410	45/154	10/34	45/154	15/51
Wapsinonoc Creek						
West Liberty M-202		0.375	45/141	10/31	45/141	15/47
West Branch M-203		0.209	45/78	10/17	45/78	15/26
Big Slough						
Nichols M-205		0	Controlled Discharge			
Long Creek						
River Products I-141		0.030[d]	c	c	c	c
Natural Gas Pipeline Co. Cairo Gas Storage I-142		0.096[d]	b	b	b	b

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD^a (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD^a (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Iowa River						
H. J. Heinz I-143			b	b	b	b
Wapello M-211		0	Controlled Discharge			
Otter Creek						
Morning Sun M-212		0	Controlled Discharge			
Mississippi River						
Hawkeye Creek						
Mediapolis M-214		0	Controlled Discharge			
Raid Quarries Nelson Quarry I-144		0.023^d	c	c	c	c
Flint Creek						
Kaser Construction Co. Mediapolis Quarry I-145		0.370^d	c	c	c	c
U.S. Gypsum I-146		0.045^d	b	b	b	b
Burlington Northern R.R. I-147		0.080^d	b	b	b	b
Flint Creek						
TRW/IRC Fixed Resistors I-149		0.040^d	b	b	b	b

TABLE VI-1
SUMMER - WINTER
WASTE LOAD ALLOCATION

Discharger (Reference Number)	Stream Flow (MGD)	1990 Discharge (MGD)	Summer		Winter	
			Ultimate BOD[a] (mg/l)/lbs/day)	Ammonia-N (mg/l)/(lbs/day)	Ultimate BOD[a] (mg/l)/(lbs/day)	Ammonia-N (mg/l)/(lbs/day)
Rutherford Potato I-150		0.200[d]	b	b	b	b
J. I. Case I-151		0.120[d]	b	b	b	b
Mississippi River						
Midwest Mfg. I-148		0.476[d]	b	b	b	b
Riley Bros. I-152			b	b	b	b
Burlington M-215		3.564	45/1,338	10/297	45/1,338	15/446
American Oil I-153		0.022[d]	b	b	b	b
Iowa Southern Utilities I-154		115.336[d]	b	b	b	b
Spring Creek						
West Burlington M-216		0.537	45/202	10/45	45/202	15/67

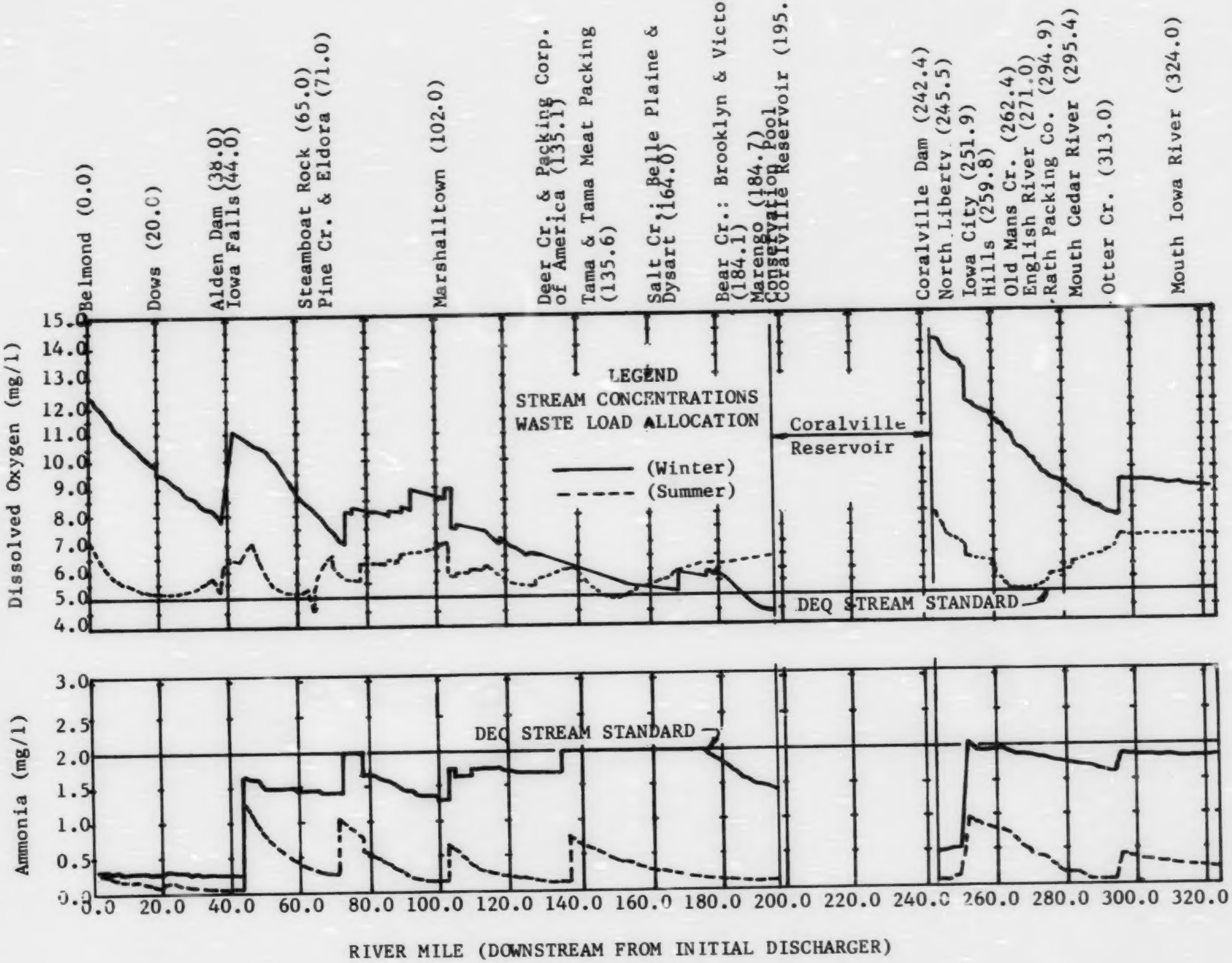
a. Ultimate BOD = 1.5 (BOD_5).

b. Discharge quantities should be in accordance with final standard industrial classification, "Best Practicable Waste Treatment Technology."

c. Quarry dewatering and rock washing. No reported BOD or ammonia. Flow from quarry will be low or zero during low flow periods.

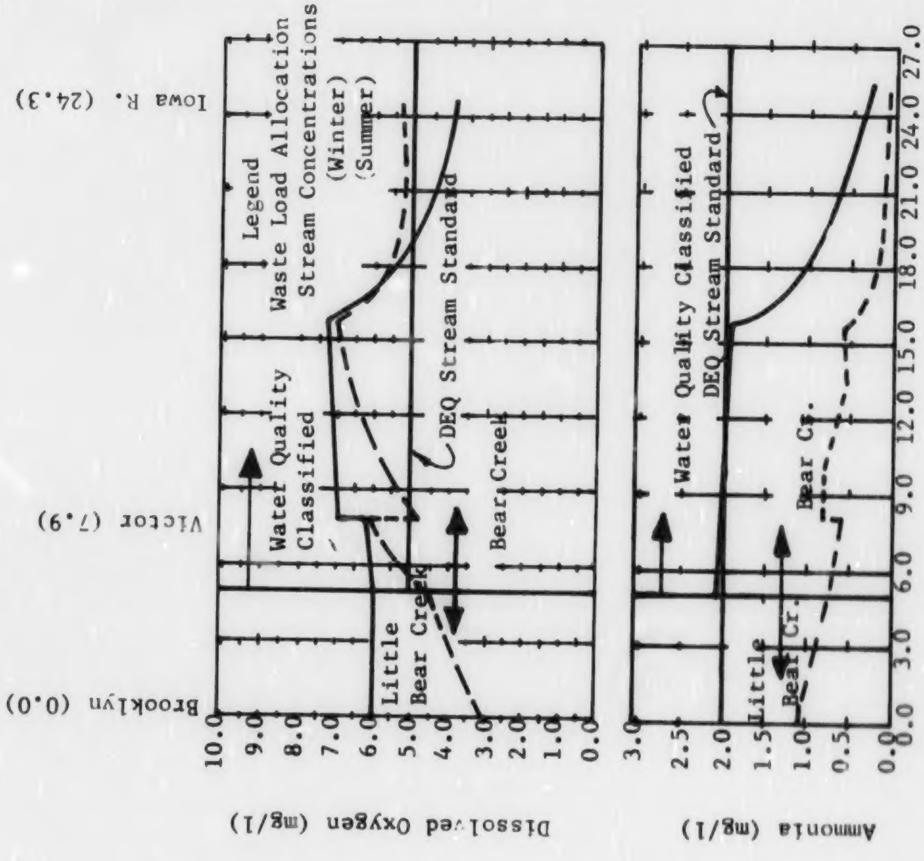
d. Reported value of existing discharge.

e. Discharge expected to be connected to city sewerage system.



IOWA RIVER

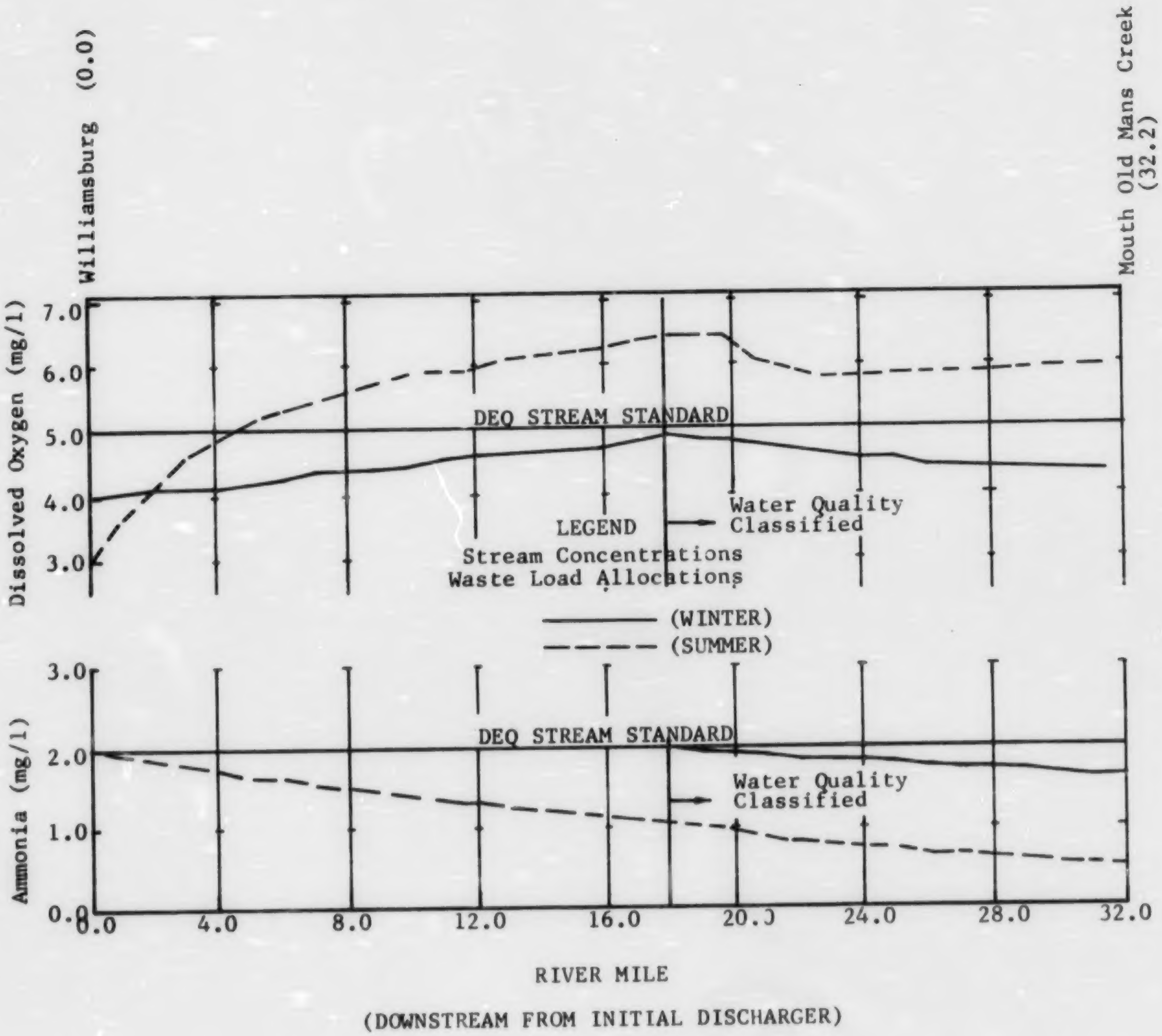
FIGURE VI-1



RIVER MILE (DOWNSTREAM FROM INITIAL DISCHARGER

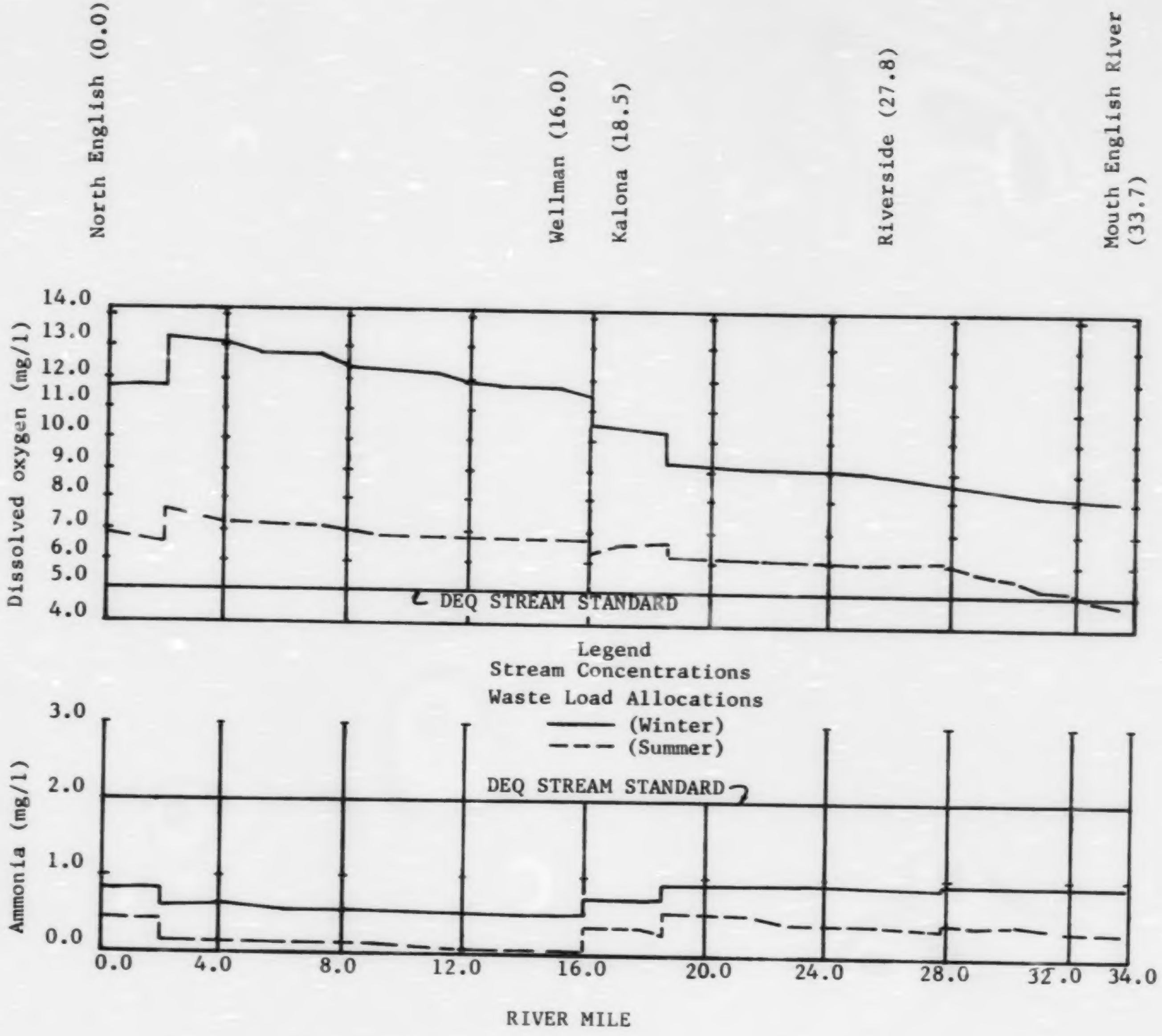
BEAR CREEK AND LITTLE BEAR CREEK

Figure VI-2



OLD MANS CREEK

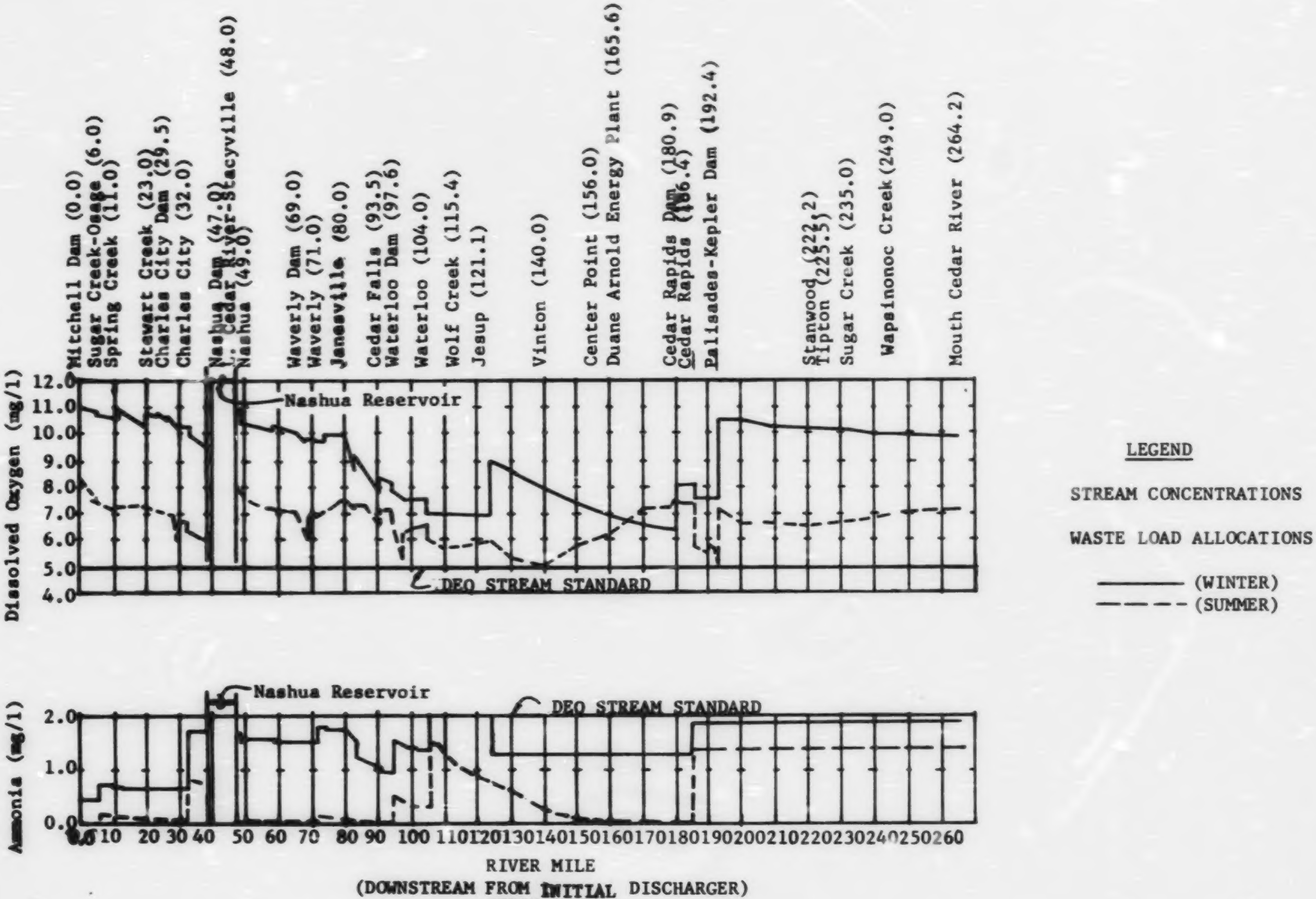
FIGURE VI-3



(DOWNSTREAM FROM INITIAL DISCHARGER)

ENGLISH RIVER

Figure VI- 4



CEDAR RIVER

FIGURE VI-5

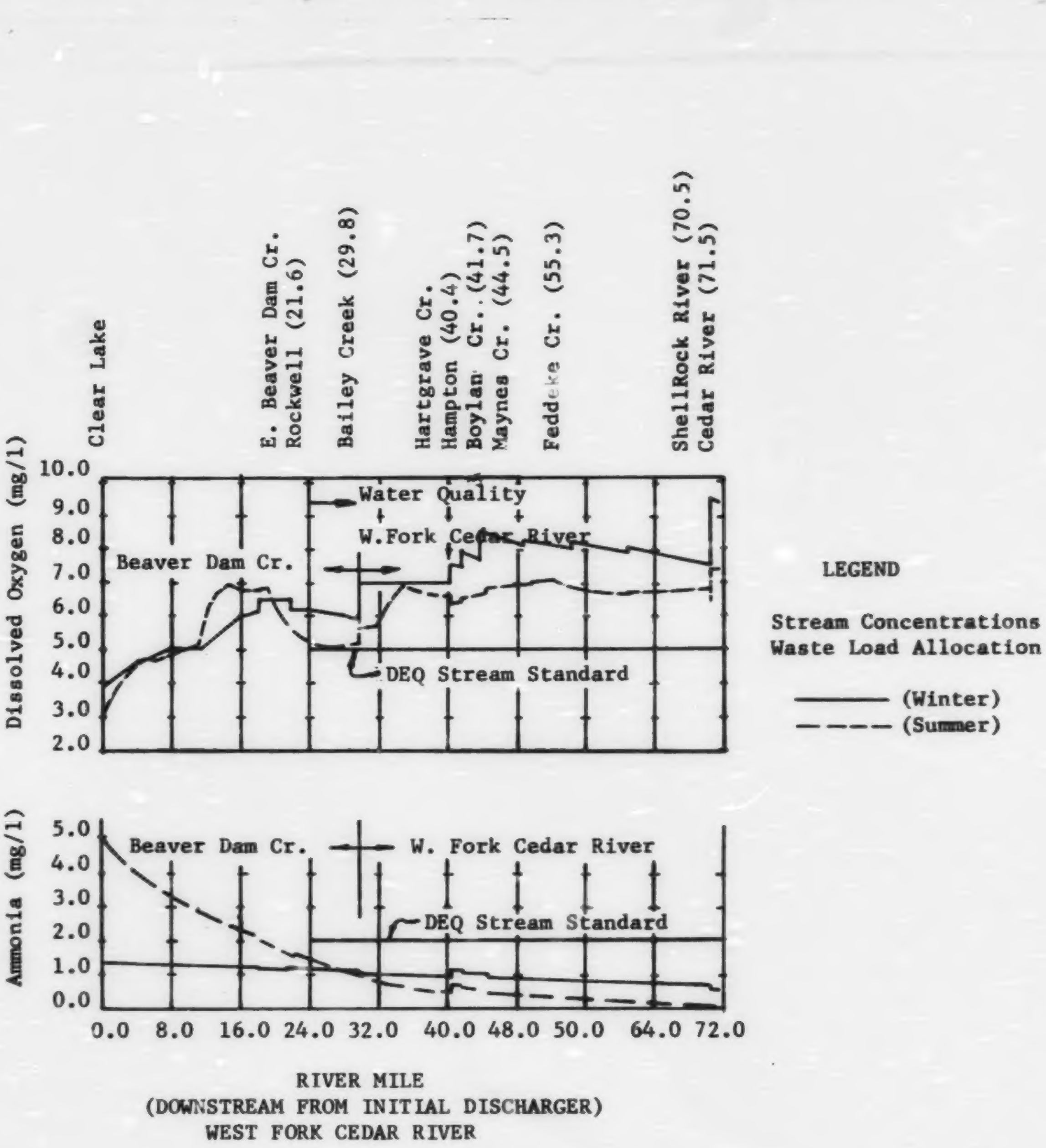
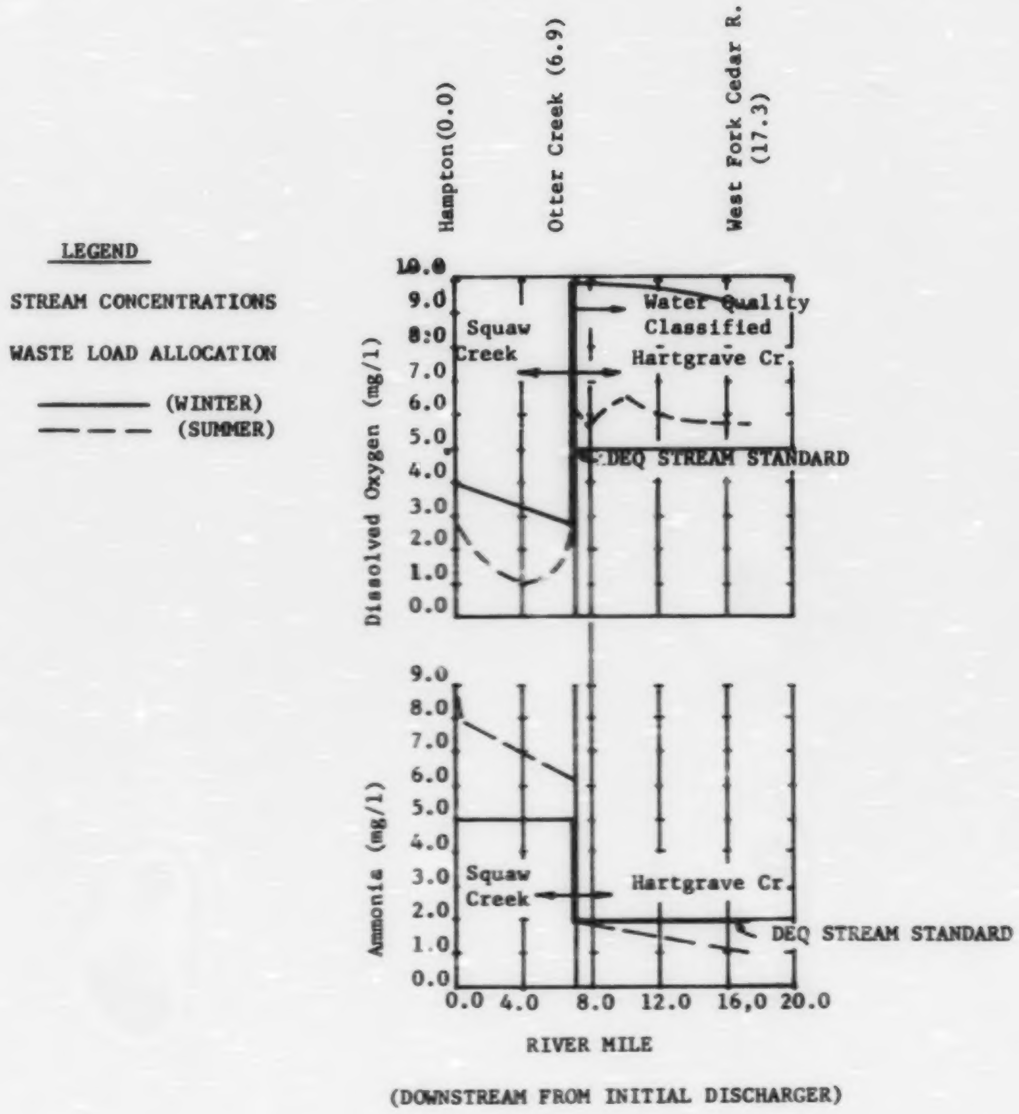
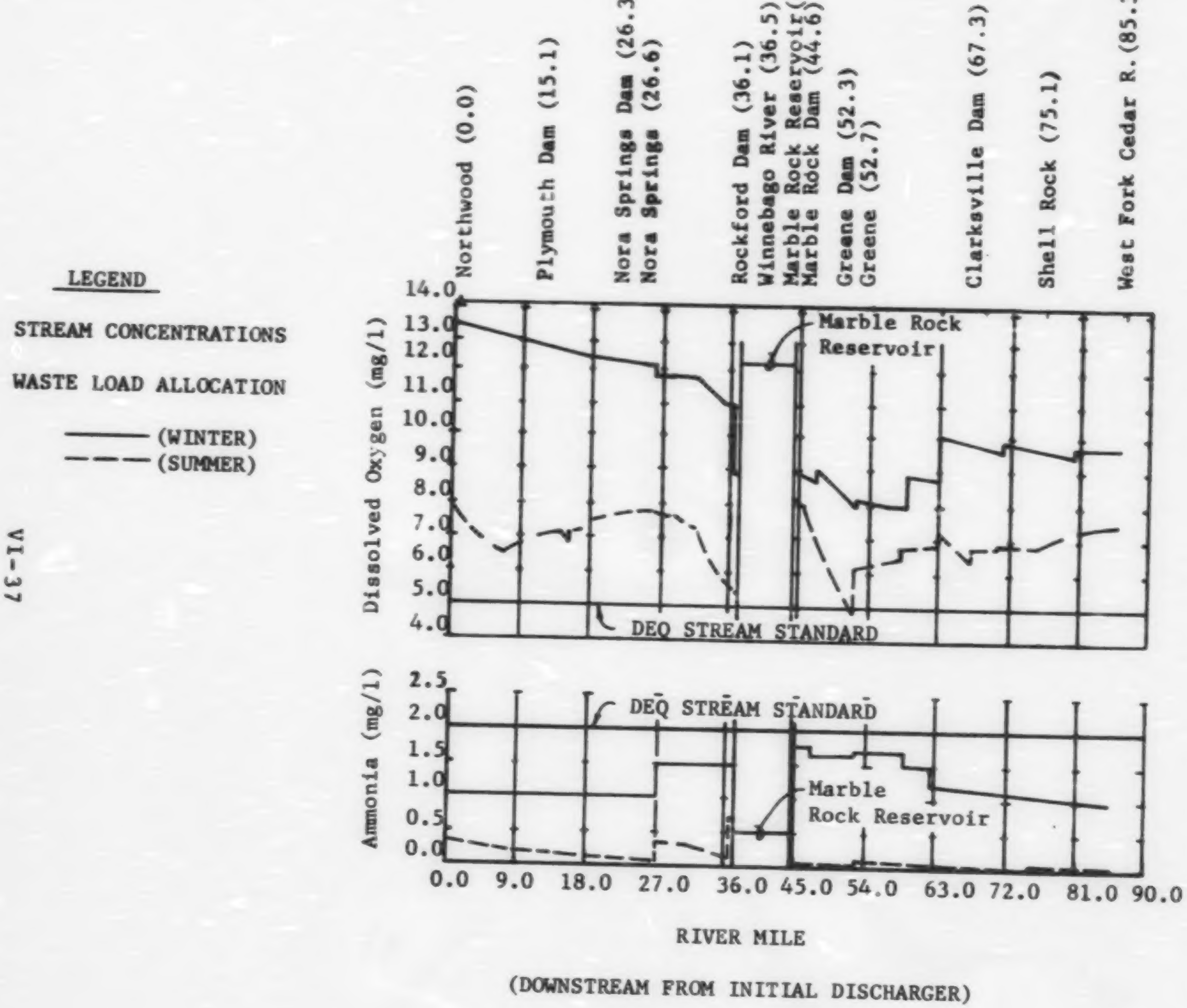

Clear Lake
E. Beaver Dam Cr.
Rockwell (21.6)
Bailey Creek (29.8)
Hartgrave Cr.
Hampton (40.4)
Boylan Cr. (41.7)
Maynes Cr. (44.5)
Feddeke Cr. (55.3)
ShellRock River (70.5)
Cedar River (71.5)
Dissolved Oxygen (mg/1)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
Water Quality
W.Fork Cedar River
Beaver Dam Cr.
DEQ Stream Standard
Ammonia (mg/1)
5.0
4.0
3.0
2.0
1.0
0.0
Beaver Dam Cr.
W. Fork Cedar River
DEQ Stream Standard
0.0
8.0
16.0
24.0
32.0
40.0
48.0
50.0
64.0
72.0
RIVER MILE
(DOWNSTREAM FROM INITIAL DISCHARGER)
WEST FORK CEDAR RIVER
LEGEND
Stream Concentrations
Waste Load Allocation
(Winter)
(Summer)

Figure VI-6



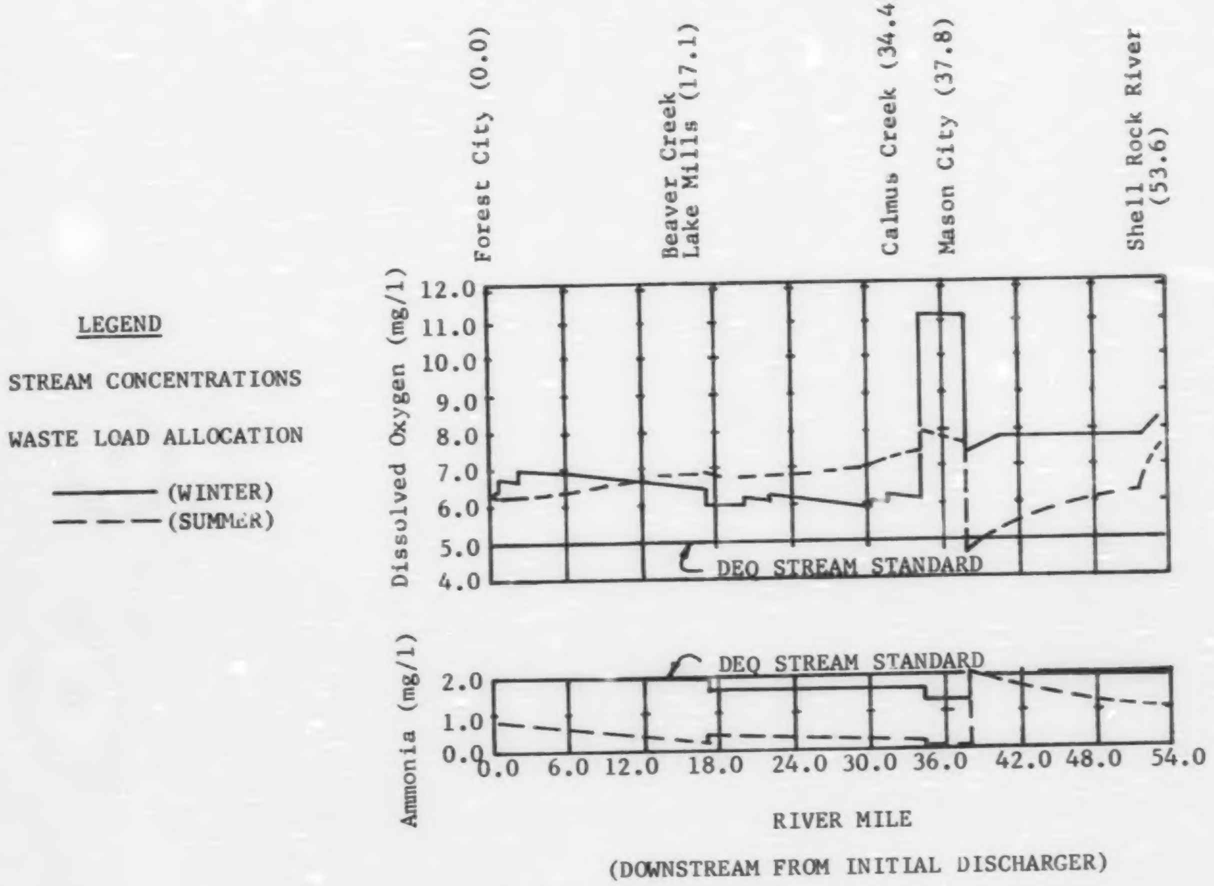
HARTGRAVE CREEK

Figure VI-7



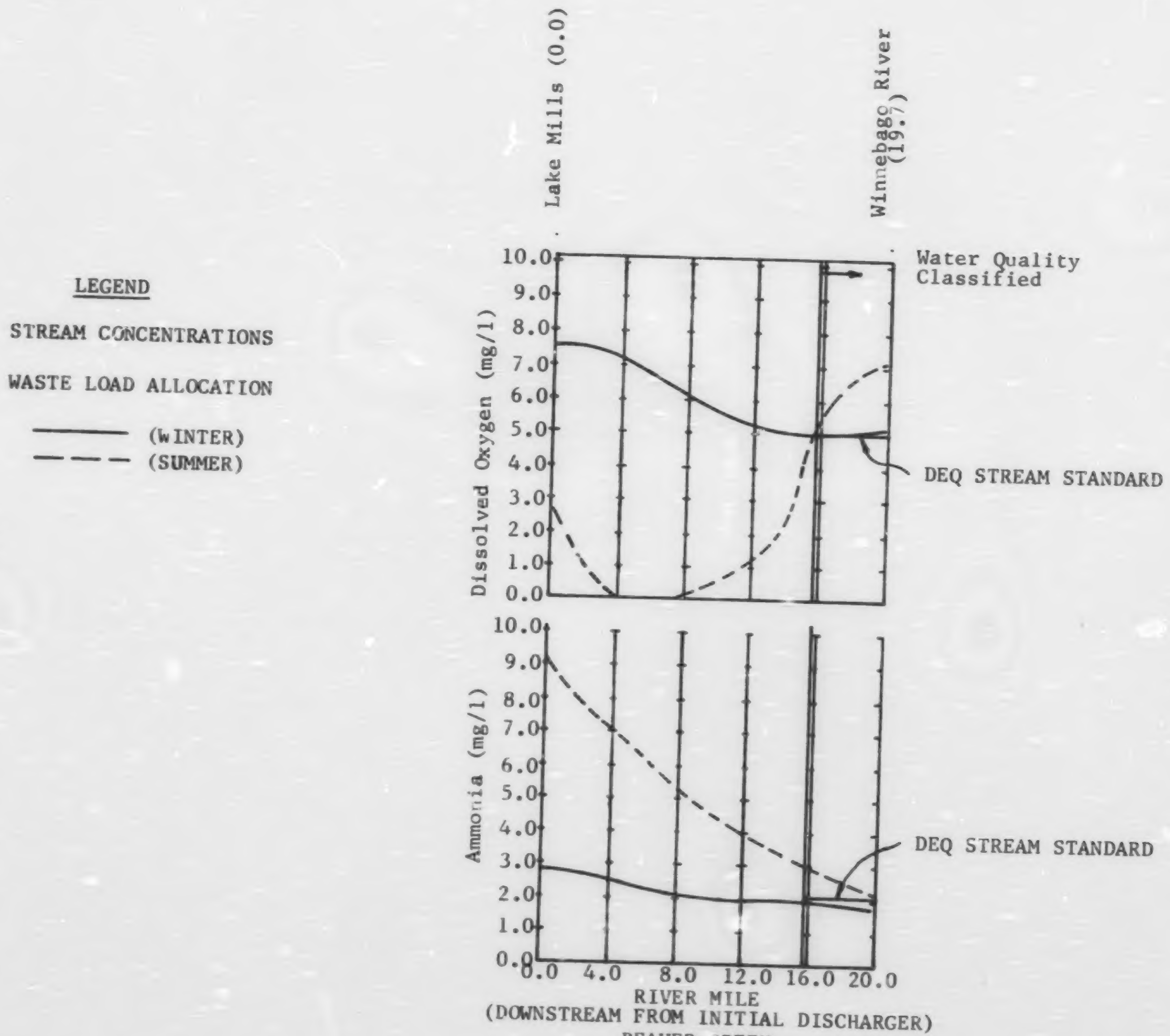
SHELL ROCK RIVER

Figure VI-8



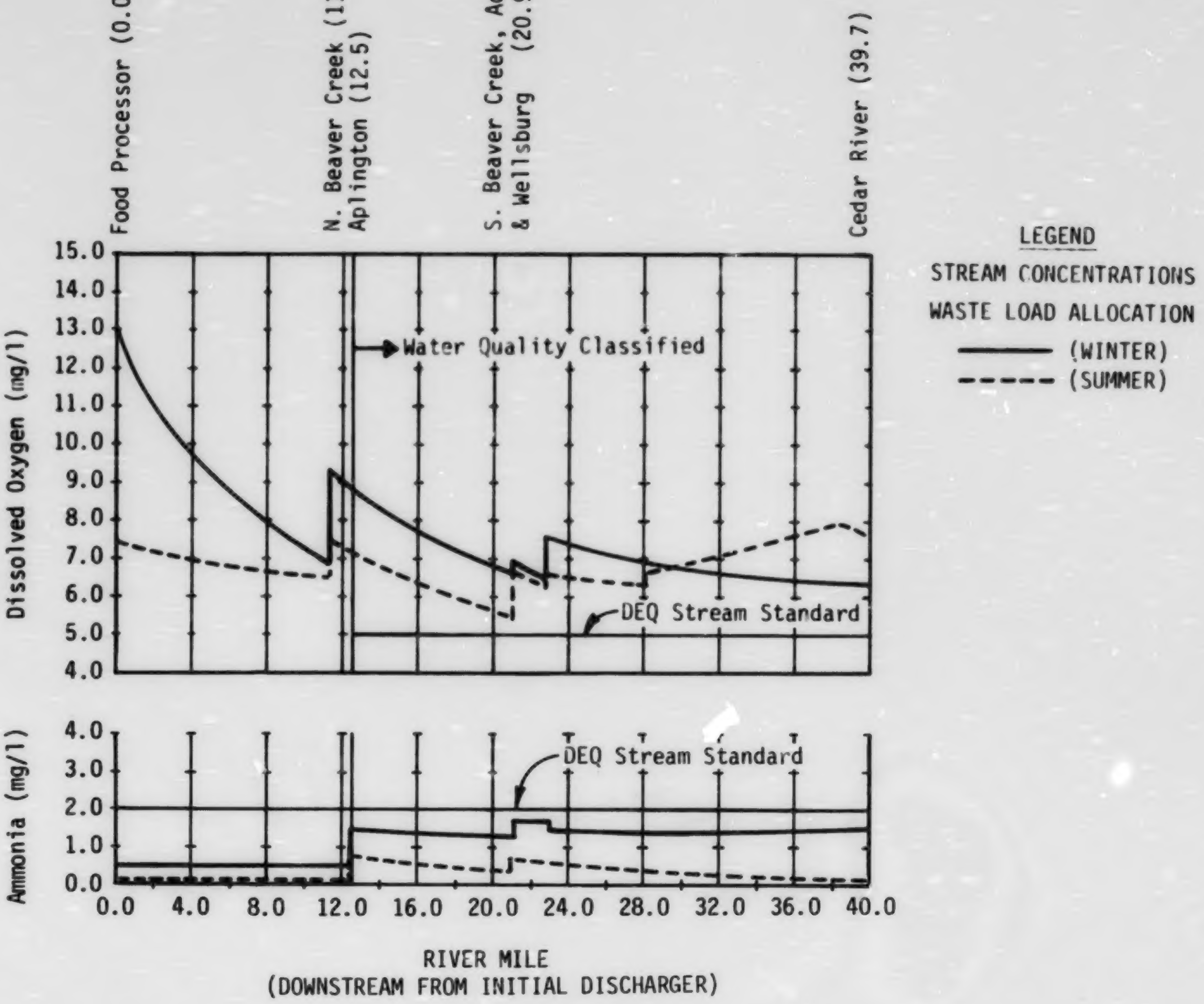
WINNEBAGO RIVER

FIGURE VI-9



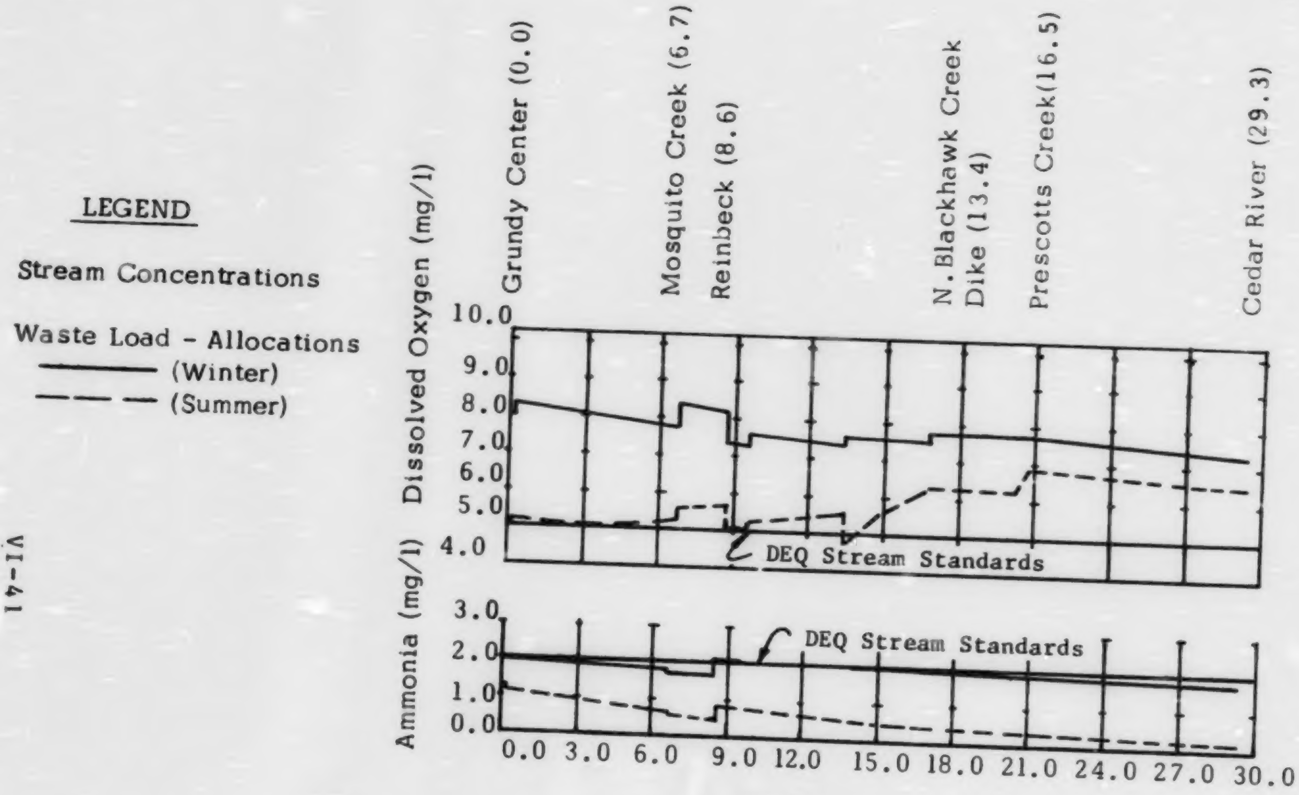
BEAVER CREEK

FIGURE VI-10



BEAVER CREEK

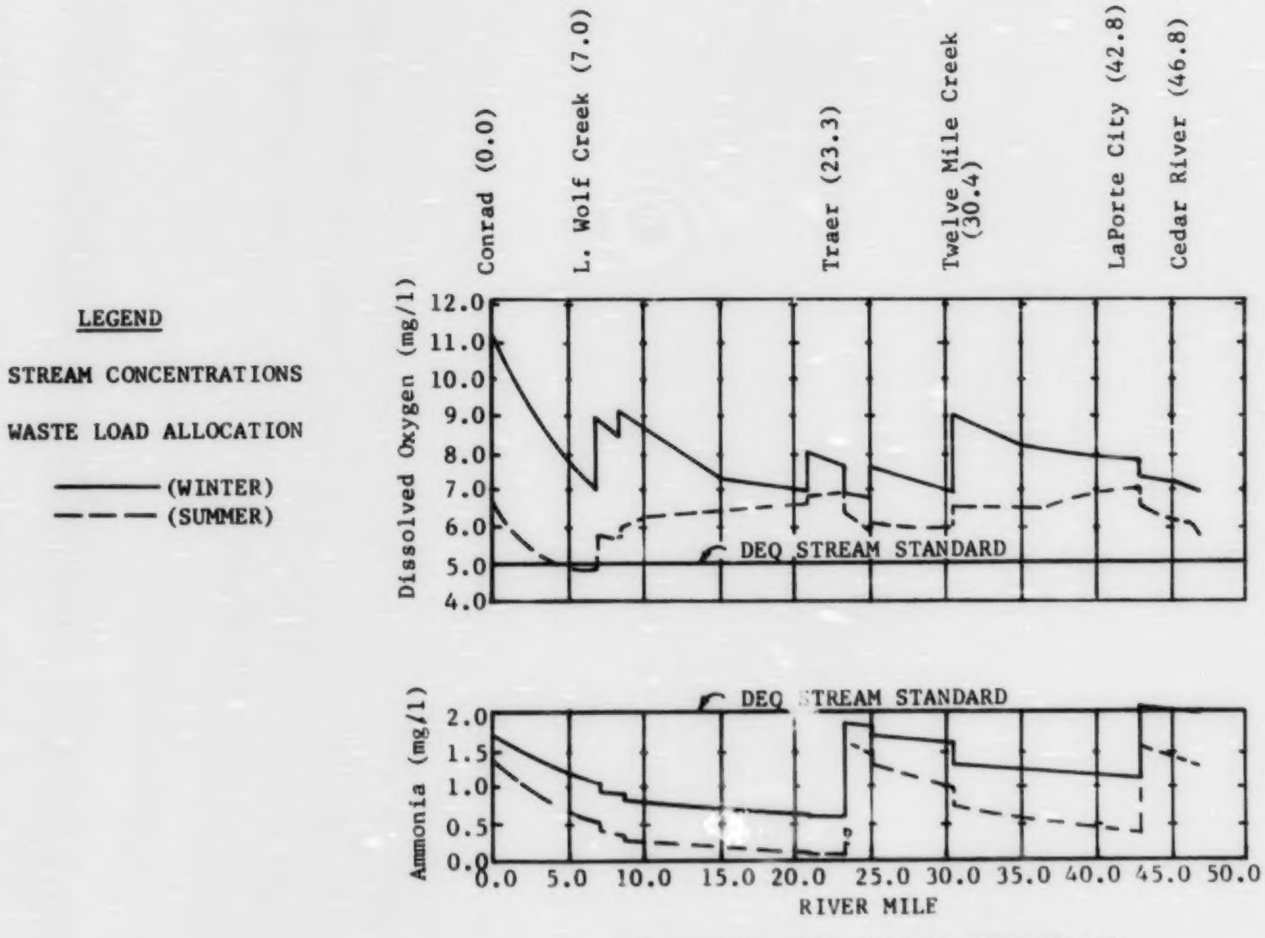
FIGURE VI-11



DOWNSTREAM FROM INITIAL DISCHARGER

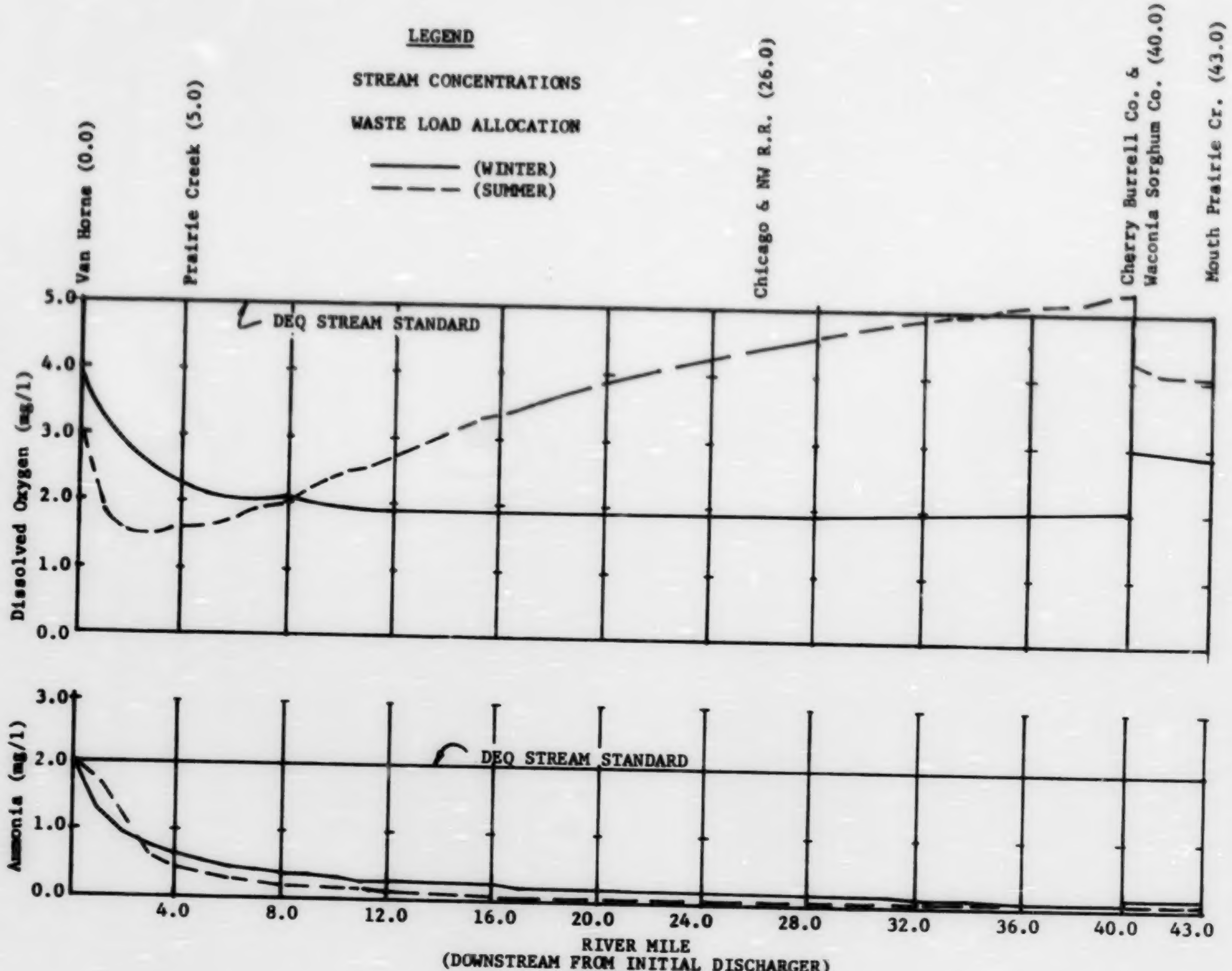
BLACK HAWK CREEK

Figure VI-12



WOLF CREEK

FIGURE VI-13



PRAIRIE CREEK

FIGURE VI-14

Considerations

Four basic considerations go into the selection of the specific effluent limitation for any given discharge. These involve secondary treatment, best practicable control technology currently available (BPT), applicable standards, and antidegradation.

Secondary Treatment - The Act requires that all publicly-owned treatment works shall, by July 1, 1977, achieve, as a minimum, secondary treatment. No municipal discharge is, therefore, allowed an effluent limitation less stringent than secondary treatment. Secondary treatment has been defined by EPA and/or DEQ as having the following average concentrations in the effluent: 30 mg/l BOD_5, 30 mg/l suspended solids; or not less than 85 percent removal of BOD_5 and suspended solids; and 200 most probable number/100 ml fecal coliforms.

BPT - The Act requires that all point sources other than publicly-owned treatment works shall, by July 1, 1977, achieve as a minimum, 'best practicable control technology currently available' (BPT). No industrial discharge is, therefore, allowed an effluent limitation less stringent than BPT. BPT for various industrial processes is defined by EPA in their industrial development documents.

Applicable Standards - The ultimate reason for requiring any effluent limitation is the protection of water quality. The Iowa Water Quality Standards are designed to ensure a reasonable degree of protection. All discharges are, therefore, required to meet effluent limitations stringent enough to assure that water quality standards will be met. If secondary treatment or BPT are not sufficient to meet the applicable water quality standards, a higher level of treatment is required.

Antidegradation - A policy on antidegradation has been adopted by the DEQ and is incorporated in the Water Quality Standards to assure that in those places where water quality significantly exceeds that of the standards, that conditions shall be maintained. New dischargers locating in areas of high quality water may, therefore, be required to meet effluent limitations more stringent than secondary treatment or BPT, even though a lesser degree of treatment might be sufficient to meet water quality standards.

SEGMENT CLASSIFICATION

From the waste load allocation analyses a classification of stream segments is possible. Segment classification is a contributing factor in the determination of the segment ranking, discharger ranking, and compliance scheduling. The two segment types are described as follows:

1. An Effluent Limited (EL) segment is any segment where it is known that water quality is meeting and will continue to meet standards, or where there is adequate demonstration that standards will be met after application of secondary treatment or BPT to all point discharges to the segment.

2. A Water Quality Limited (WQ) segment is any segment where it is known that water quality does not currently meet applicable standards and it is not expected that standards would be met even after application of secondary treatment or BPT to all point discharges to the segment.

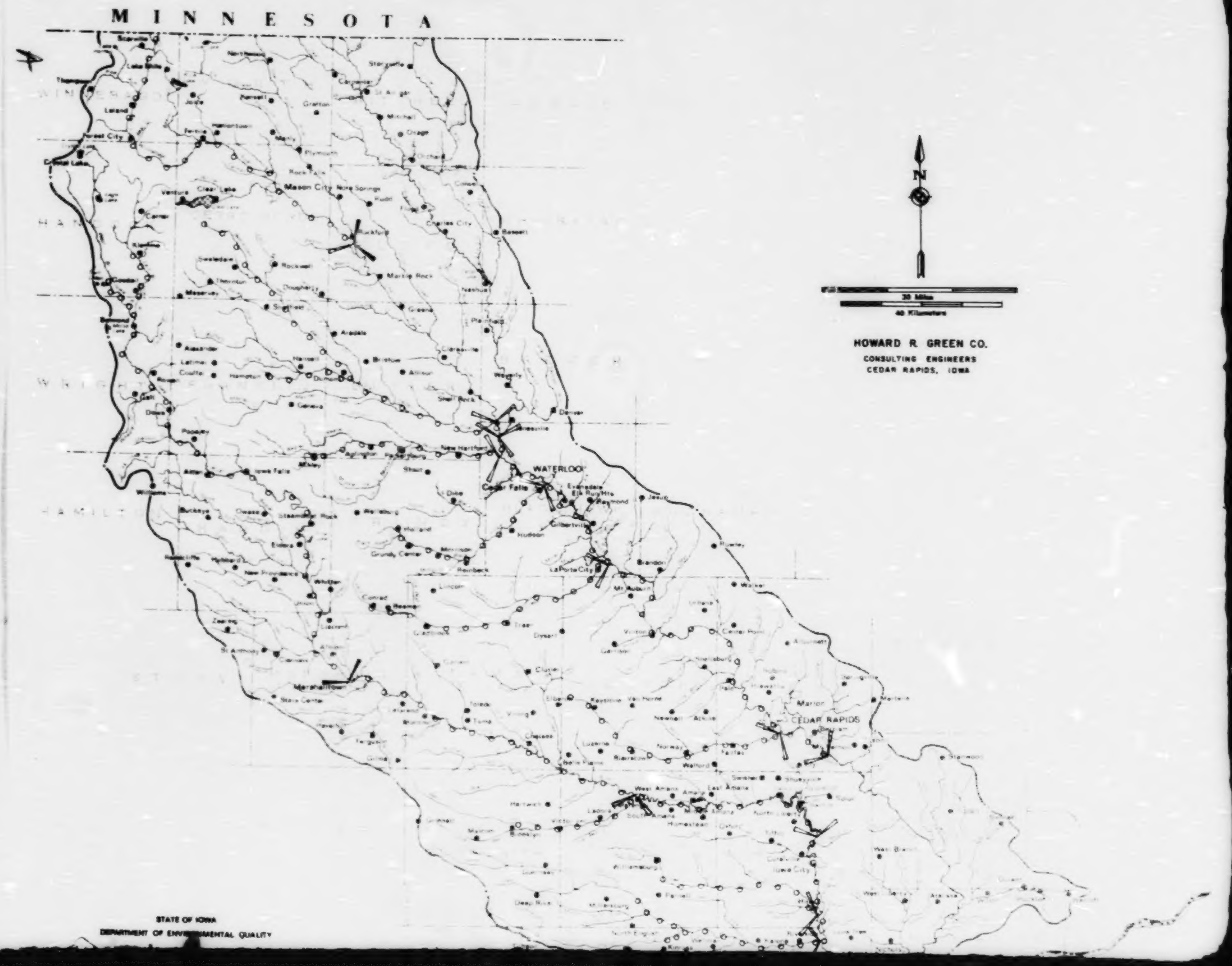
The classifications of the stream segments in the Iowa-Cedar River Basin are listed in Table VI-2. The water quality limited segments as well as the stream segment breakdown, are shown in Figure VI-15. All segments not designated as water quality limited are currently considered to be effluent limited.

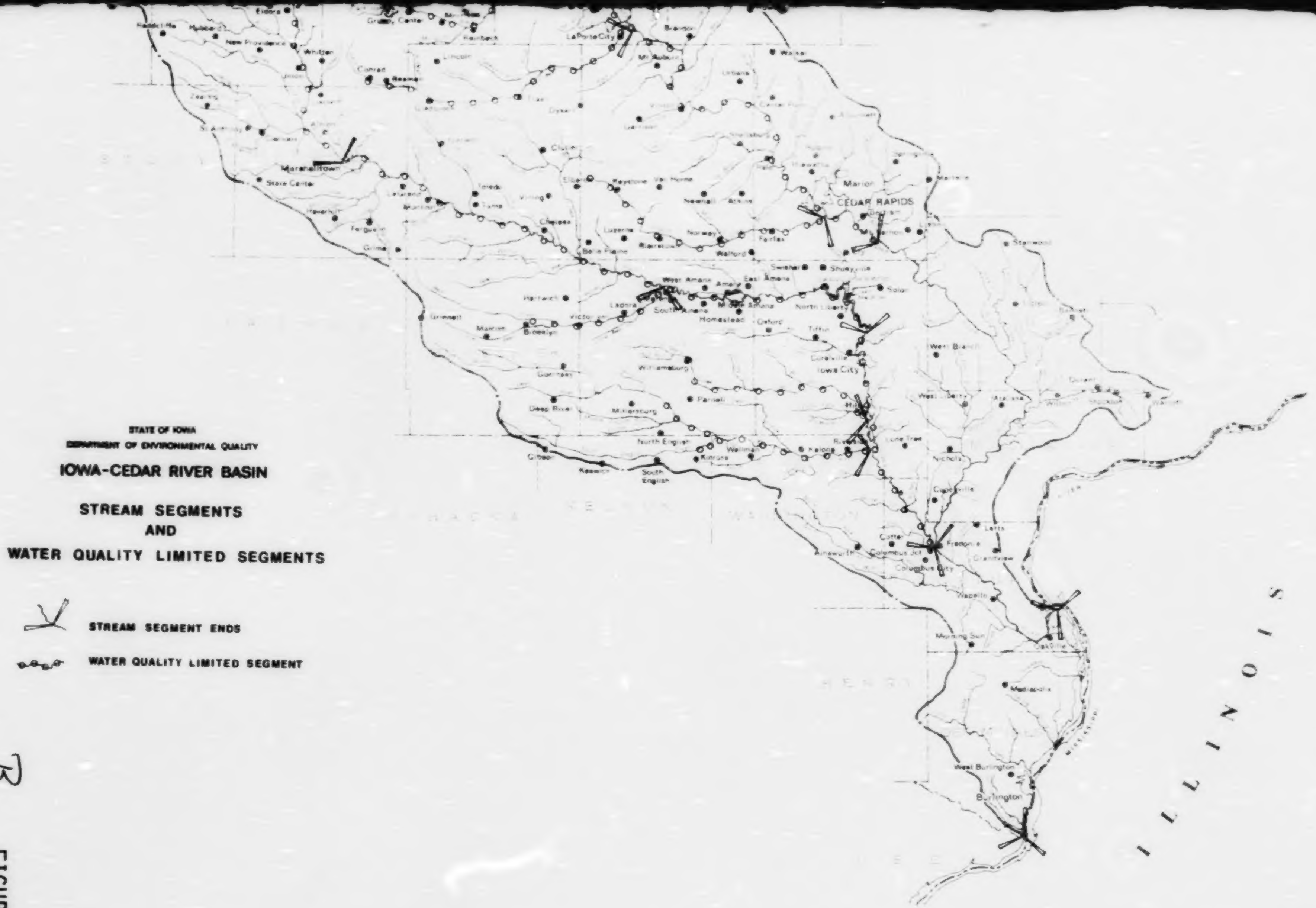
PRIORITY RANKINGS

Stream Segment Ranking

The Iowa-Cedar River Basin has been divided into various stream segments. Each stream segment consists of surface waters that have common hydrologic characteristics and natural, physical, chemical, and biological processes. The segments have been ranked in order of abatement priority. The ranking methodology has attempted to take into account: (1) severity of pollution problems, (2) population affected, (3) need for preservation of high quality waters, and (4) national priorities.

The total points for a segment are determined from a product of the points earned in each of two factors. The formula weighs both the degree of usefulness of a segment and the severity of the pollution problem. The


MINNESOTA
N
30 Miles
40 Kilometers
HOWARD R. GREEN CO.
CONSULTING ENGINEERS
CEDAR RAPIDS, IOWA
STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
A
WINNEBAGO
HANCOCK
WRIGHT
HAMILTON
Forest City
Clear Lake
Mason City
Nora Springs
Rockford
Charles City
Nashua
Marble Rock
Greene
Plainfield
Clarksville
Waverly
Shell Rock
Denver
Janesville
Iowa Falls
New Hartford
Cedar Falls
WATERLOO
Evansdale
Elk Run Hts
Raymond
Gilbertville
Hudson
Jesup
La Porte City
Brandon
Grundy Center
Reinbeck
Marshalltown
State Center
Tama
Toledo
Traer
Dysart
Vinton
Belle Plaine
Center Point
Marion
CEDAR RAPIDS
West Amana
Amana
East Amana
South Amana
Homestead
Iowa City
Coralville
Williamsburg
Deep River
Millersburg
North English
Osage
Mitchell
St. Ansgar
Stacyville
Carpenter
Northwood
Grafton
Plymouth
Rock Falls
Sheffield
Dougherty
Rockwell
Swaledale
Thornton
Meservey
Dows
Alden
Williams
Buckeye
Ackley
Aplington
Parkersburg
Hampton
Dumont
Allison
Bristow
Aredale
Latimer
Coulter
Steamboat Rock
Eldora
New Providence
Whitten
Union
Conrad
Beaman
Lincoln
Garwin
Clutier
Elberon
Keystone
Van Horne
Newhall
Atkins
Shellsburg
Luzerne
Norway
Fairfax
Walford
Blairstown
Swisher
Shueyville
Solon
North Liberty
Hiawatha
Mount Vernon
Martelle
Urbana
Walker
Stanwood
West Branch
Marengo
Victor
Ladora
Malcom
Brooklyn
Hartwick
Grinnell
Chelsea
Vining
Gladbrook
Dike
Stout
Wellsburg
Holland
Morrison
Dike
Zearing
St. Anthony
Clemons
Albion
Liscomb
Ferguson
Gilman
Haverhill
LeGrand
Montour
Garrison
Mt. Auburn
Oxford
Tiffin
Parnell
Kalona
Riverside
Atalissa
West Liberty


ILLINOIS
CEDAR RAPIDS
Marion
Iowa City
Coralville
Marshalltown
Burlington
West Burlington
Mediapolis
Oakville
Morning Sun
Wapello
Columbus City
Columbus Jct
Fredonia
Grandview
Letts
Nichols
Lone Tree
West Liberty
West Branch
Tiffin
Oxford
Homestead
North Liberty
Solon
Shueyville
Swisher
Walford
Fairfax
Norway
Blairstown
Luzerne
Belle Plaine
Keystone
Van Horne
Newhall
Atkins
Elberon
Chelsea
Tama
Toledo
Vining
Clutier
Montour
LeGrand
State Center
Haverhill
Ferguson
Gilman
Grinnell
Malcom
Brooklyn
Victor
Hartwick
Ladora
South Amana
West Amana
Amana
Middle Amana
East Amana
Williamsburg
Parnell
Millersburg
Deep River
Guernsey
North English
Wellman
Kinross
Kalona
Riverside
Gibson
Keswick
South English
Ainsworth
Cotter
Walker
Brandon
La Porte City
Mt Auburn
Urbana
Center Point
Conrad
Beaman
Lincoln
Dysart
Reinbeck
Grundy Center
Whitten
Union
New Providence
Hubbard
Radcliffe
Eldora
Zearing
St Anthony
Stanwood
Durant
Wilton
Atalissa
Stockton
Walcott
STREAM SEGMENT ENDS
WATER QUALITY LIMITED SEGMENT

STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN

STREAM SEGMENTS
AND
WATER QUALITY LIMITED SEGMENTS

B

FIGURE VI-15

TABLE VI-2

STREAM SEGMENT RANKING

				PRIORITY CRITERIA									
RANK	RIVER	STREAM SEGMENT	WQ/ EL*	A	B_c	B_w	C	BC	AES	POP	SQ	Total Points	Priority Points
1	Cedar River	W. Frk. Cedar R. to dam at Palisades-Kepler State Park	WQ	2	0	1	2	1	0	2.0	6	51.0	19
2	Iowa River	Marshalltown to Coralville Reservoir Dam	WQ	2	0	1	0	1	0	2.0	6	39.0	18
3	Iowa River	Above Marshalltown, Iowa	WQ	2	0	1	0	1	0	1.5	6	36.0	17
4	Iowa River	Coralville Reservoir Dam to Cedar River	WQ	2	0	1	2	1	0	2.0	4	34.0	16
5	Mississippi R.	Iowa River to Skunk River	EL	2	0	1	2	1	0	2.0	3	25.5	15
6	Cedar River	Minn. State line to W. Frk. Cedar River	EL	2	2	1	0	1	0	1.5	3	24.0	14
7	Winnebago River	(entire length)	WQ	0	0	1	0	1	0	2.0	5	22.5	13
8	W. Frk. Cedar R.	(entire length)	WQ	2	0	1	0	1	0	1.0	4	22.0	12
9	Wolf Creek (mouth in Black Hawk Co.)	(entire length)	WQ	0	0	1	0	1	0	1.0	5	17.5	11
10	English River	(entire length)	WQ	0	0	1	0	1	0	1.0	5	17.5	10
11	Beaver Creek (mouth in Black Hawk Co.)	(entire length)	WQ	0	0	1	0	1	0	1.0	5	17.5	9
12	Black Hawk Cr. (mouth in Black Hawk Co.)	(entire length)	WQ	0	0	1	0	0	0	1.0	5	12.5	8
13	Cedar River	Dam at Palisades-Kepler State Park to mouth	EL	0	0	1	0	1	0	1.5	3	12.0	-

TABLE VI-2

STREAM SEGMENT RANKING

			WQ/			PRIORITY CRITERIA						Total	Priority
RANK	RIVER	STREAM SEGMENT	EL*	A	B_c	B_w	C	BC	AES	POP	SQ	Points	Points
14	Shell Rock River	Minn. State line to Winnebago River	EL	0	0	1	0	1	0	1.0	3	10.5	6
15	Iowa River	Cedar River to mouth	EL	0	0	1	0	1	0	1.0	3	10.5	5
16	Shell Rock River	Winnebago River to mouth	EL	0	0	1	0	1	0	0.5	3	9.0	4
17	Prairie Creek (mouth at Cedar R.)	(entire length)	WQ	0	0	1	0	0	0	0.5	4	8.0	3
18	Bear Creek (mouth in Iowa County)	(entire length)	WQ	0	0	1	0	0	0	0.5	4	8.0	2
19	Old Mans Creek (mouth in Johnson Co.)	(entire length)	WQ	0	0	1	0	0	0	0.5	4	8.0	1

* Water Quality or Effluent Limited

specific details and rationale used for the segment ranking methodology have been described in Chapter I.

Table VI-2 lists the stream segments selected, their respective priority points, and their final ranking. Figure VI-15 shows the stream segments.

Municipal Discharger Ranking

The significant municipal dischargers in the basin have been ranked, taking into consideration the segment priority ranking, to be subsequently used in establishing priorities and output estimates for municipal facilites construction. The relative significance of each discharger is determined by its total points as calculated by the discharger ranking formula. The specific details and rationale used for the municipal discharger ranking methodology have been described in Chapter I.

Table VI-3 lists the municipal treatment facilities and municipalities in the basin without treatment facilities, but with a projected 1990 population of over 200, their priority points, and their final ranking.

Waste Load Reductions

Table VI-4 lists the municipal and industrial discharges in the Iowa-Cedar River Basin, and the anticipated amount of increase or decrease in the waste discharged from the present to 1990.

TABLE VI-3

MUNICIPAL DISCHARGER RANKING

RANK	MUNICIPALITY	DISCHARGE CRITERIA A_1	A_2	B_1	B_2	D_1	D_2	SEGMENT POINTS	PRIORITY POINTS
1	Cedar Rapids-Main	60	60	.50	.86	25	25	19	134.60
2	Waterloo	40	40	.68	.88	25	25	19	120.40
3	Williamsburg	60	40	.79	.91	12	12	1	105.20
4	Reinbeck	60	30	.80	.82	14	9	8	99.18
5	Vinton	60	40	.64	.50	18	16	19	96.92
6	Lake Mills	30	30	.81	.92	12	12	13	95.66
7	Janesville	60	40	.84	.38	12	7	14	92.34
8	Charles City	50	60	.48	.66	18	18	7	91.12
9	Nashua	60	40	.61	.53	12	12	14	85.48
10	North English	30	30	.74	.91	9	9	10	74.35
11	Hudson	60	30	.60	.52	14	9	8	72.68
12	Grundy Center	40	20	.73	.78	14	12	8	72.38
13	Brooklyn	30	30	.73	.88	9	9	2	64.79
14	Greene	40	50	.45	.60	12	12	4	64.60
15	Jesup	20	20	.60	.81	12	12	19	64.12
16	Steamboat Rock	50	30	.53	.50	5	5	17	63.65
17	Iowa Falls	20	30	.51	.66	14	14	17	63.38
18	Wellsburg	60	40	.50	.40	9	7	9	62.30
19	Marshalltown	20	20	.44	.75	18	16	18	61.72
20	Traer	40	40	.33	.59	12	12	11	58.84
21	Springville	50	30	.45	.28	12	12	19	58.66
22	Aplington	30	30	.70	.62	7	7	9	57.84
23	Shell Rock	50	40	.51	.48	9	9	4	57.61
24	Clear Lake S.D.	20	20	.49	.74	16	16	13	57.28
25	Dows	20	20	.57	.88	7	7	17	56.15
26	Belmond	20	20	.40	.82	12	12	17	56.04
27	Tama	60	20	.46	.09	14	12	18	54.92

TABLE VI-3

MUNICIPAL DISCHARGER RANKING

RANK	MUNICIPALITY	DISCHARGE CRITERIA						SEGMENT POINTS	PRIORITY POINTS
		$\underline{A}_1$	$\underline{A}_2$	$\underline{B}_1$	$\underline{B}_2$	$\underline{D}_1$	$\underline{D}_2$		
28	Rockwell	60	20	.59	0	12	9	12	54.48
29	Burlington	40	40	.32	.34	18	18	15	53.28
30	Mason City	20	20	.51	.56	18	16	13	52.54
31	Osage	50	40	.25	.36	14	14	14	49.44
32	Victor	20	20	.66	.86	7	7	2	43.04
33	Van Horne	30	30	.26	.83	5	7	3	42.81
34	Wellman	20	20	.48	.67	9	7	10	42.01
35	Dike	30	30	.37	.48	9	9	8	41.15
36	Conrad	20	20	.60	.50	7	5	11	39.70
37	Shellsburg	40	40	.22	.20	9	9	19	39.58
38	Hampton	30	10	.34	.54	14	12	12	38.84
39	Palo	50	40	.18	.18	9	9	19	38.44
40	Ackley	20	20	.59	.31	9	9	9	35.10
41	LaPorte City	30	30	0	.47	12	12	11	30.74
42	Forest City-Main	20	10	.17	.40	12	9	13	26.04
43	Waverly	30	30	.05	.22	14	14	14	25.80
44	Riverside	20	20	.03	.50	5	5	10	23.25
45	Orchard	20	20	.04	.29	1	1	14	20.93
46	Clarksville	60	30	.22	0	12	9	4	19.84
47	Cedar Falls-Cedar Hts.	20	20	.02	0	7	5	19	19.54
48	Cedar Rapids-Indian Cr.	20	20	0	0	18	18	19	19.00
49	Cedar Falls-Main	20	10	0	0	18	16	19	19.00
50	Evansdale	20	10	0	0	12	12	19	19.00
51	Center Point	40	30	0	0	9	9	19	19.00
52	Elk Run Hts.	20	20	0	0	7	5	19	19.00
53	Urbana	20	20	0	0	7	7	19	19.00
54	Walker	30	30	0	0	7	7	19	19.00

TABLE VI-3

MUNICIPAL DISCHARGER RANKING

RANK	MUNICIPALITY	DISCHARGE CRITERIA A_1	A_2	B_1	B_2	D_1	D_2	SEGMENT POINTS	PRIORITY POINTS
55	Alburnett	20	20	0	0	5	5	19	19.00
56	Atkins	30	30	0	0	7	7	19	19.00
57	Newhall	30	30	0	0	5	7	19	19.00
58	Garrison	20	20	0	0	5	5	19	19.00
59	Brandon	20	20	0	0	3	3	19	19.00
60	Mt. Auburn	20	20	0	0	3	5	19	19.00
61	Robins		N E M T F					19	19.00
62	Gilbertville		N E M T F					19	19.00
63	Raymond		N E M T F					19	19.00
64	Martelle		N E M T F					19	19.00
65	Bertram		N E M T F					19	19.00
66	Marengo	20	20	0	0	9	9	18	18.00
67	Belle Plaine	20	20	0	0	9	9	18	18.00
68	Toledo	20	10	0	0	9	9	18	18.00
69	State Center	20	20	0	0	9	9	18	18.00
70	Amana S.D.	20	20	0	0	9	9	18	18.00
71	Dysart	30	30	0	0	9	9	18	18.00
72	Solon	20	20	0	0	7	7	18	18.00
73	Legrand	30	10	0	0	7	5	18	18.00
74	Swisher	20	20	0	0	5	5	18	18.00
75	Gilman	20	20	0	0	5	5	18	18.00
76	Garwin	40	20	0	0	7	5	18	18.00
77	Ely	20	20	0	0	5	5	18	18.00
78	Clutier	20	20	0	0	5	5	18	18.00
79	Homestead	20	20	0	0	5	5	18	18.00
80	Montour	30	30	0	0	5	5	18	18.00
81	Chelsea		N E M T F					18	18.00

TABLE VI-3

MUNICIPAL DISCHARGER RANKING

RANK	MUNICIPALITY	DISCHARGE CRITERIA $\underline{A}_1$	$\underline{A}_2$	$\underline{B}_1$	$\underline{B}_2$	$\underline{D}_1$	$\underline{D}_2$	SEGMENT POINTS	PRIORITY POINTS
82	Walford		N E M T F					18	18.00
83	Elberon		N E M T F					18	18.00
84	Ferguson		N E M T F					18	18.00
85	West Amana S.D.		N E M T F					18	18.00
86	Shueyville		N E M T F					18	18.00
87	Haverhill		N E M T F					18	18.00
88	Garner	50	40	0	0	12	12	17	17.00
89	Eldora-Reformatory	50	20	0	0	12	9	17	17.00
90	Eldora-Main	20	20	0	0	9	9	17	17.00
91	Hubbard	30	30	0	0	9	9	17	17.00
92	Alden	30	30	0	0	7	7	17	17.00
93	Williams	30	30	0	0	7	7	17	17.00
94	Zearing	20	20	0	0	7	7	17	17.00
95	Union	20	20	0	0	5	7	17	17.00
96	Klemme	20	20	0	0	5	7	17	17.00
97	Albion	20	20	0	0	5	5	17	17.00
98	Clemons	20	20	0	0	5	5	17	17.00
99	Raddcliffe	20	20	0	0	5	5	17	17.00
100	Liscomb	20	20	0	0	1	3	17	17.00
101	Crystal Lake		N E M T F					17	17.00
102	Rowan		N E M T F					17	17.00
103	Goodell		N E M T F					17	17.00
104	New Providence		N E M T F					17	17.00
105	St. Anthony		N E M T F					17	17.00
106	Iowa City-Main	20	20	0	0	18	18	16	16.00
107	Coralville	30	30	0	0	16	16	16	16.00
108	North Liberty	30	30	0	0	9	12	16	16.00

TABLE VI-3

MUNICIPAL DISCHARGER RANKING

RANK	MUNICIPALITY	DISCHARGE CRITERIA $\underline{A}_1$	$\underline{A}_2$	$\underline{B}_1$	$\underline{B}_2$	$\underline{D}_1$	$\underline{D}_2$	SEGMENT POINTS	PRIORITY POINTS
109	Columbus Junction	40	40	0	0	9	9	16	16.00
110	Lone Tree N	30	30	0	0	7	9	16	16.00
111	Hills	20	20	0	0	7	5	16	16.00
112	Oxford	20	20	0	0	5	5	16	16.00
113	Conesville	20	20	0	0	5	5	16	16.00
114	Tiffin	20	20	0	0	5	3	16	16.00
115	Lone Tree S	20	20	0	0	3	3	16	16.00
116	Indian Creek-Westinghouse	20	20	0	0	0	1	16	16.00
117	West Burlington	20	20	0	0	14	12	15	15.00
118	Mediapolis	20	20	0	0	9	9	15	15.00
119	St. Ansgar	40	40	0	0	9	9	14	14.00
120	Denver	20	20	0	0	7	7	14	14.00
121	Floyd	20	20	0	0	7	7	14	14.00
122	Stacyville	20	20	0	0	5	3	14	14.00
123	Plainfield	60	60	0	0	7	5	14	14.00
124	Grafton		N E	M	T	F		14	14.00
125	Mitchell		N E	M	T	F		14	14.00
126	Forest City-Lagoon	20	10	0	0	9	7	13	13.00
127	Leland	20	20	0	0	5	5	13	13.00
128	Thompson		N E	M	T	F		13	13.00
129	Fertile		N E	M	T	F		13	13.00
130	Joice		N E	M	T	F		13	13.00
131	Hanlontown		N E	M	T	F		13	13.00
132	Dumont	20	20	0	0	12	12	12	12.00
133	Sheffield	20	20	0	0	9	9	12	12.00
134	Allison	20	20	0	0	9	9	12	12.00
135	Thornton	20	20	0	0	5	5	12	12.00

TABLE VI-3

MUNICIPAL DISCHARGER RANKING

RANK	MUNICIPALITY	DISCHARGE CRITERIA A_1	A_2	B_1	B_2	D_1	D_2	SEGMENT POINTS	PRIORITY POINTS
136	Latimer		N	E	M	T	F	12	12.00
137	Meservey		N	E	M	T	F	12	12.00
138	Coulter		N	E	M	T	F	12	12.00
139	Alexander		N	E	M	T	F	12	12.00
140	Bristow		N	E	M	T	F	12	12.00
141	Swaledale		N	E	M	T	F	12	12.00
142	Geneva		N	E	M	T	F	12	12.00
143	Gladbrook	20	20	0	0	9	9	11	11.00
144	Beaman		N	E	M	T	F	11	11.00
145	Kalona	20	20	0	0	14	14	10	10.00
146	Deep River		N	E	M	T	F	10	10.00
147	Keswick		N	E	M	T	F	10	10.00
148	South English		N	E	M	T	F	10	10.00
149	Millersburg		N	E	M	T	F	10	10.00
150	Parkersburg	50	40	0	0	12	12	9	9.00
151	New Hartford	20	20	0	0	7	7	9	9.00
152	Stout		N	E	M	T	F	9	9.00
153	Holland	20	20	0	0	5	5	8	8.00
154	Northwood	30	20	.03	0	9	9	6	7.17
155	Mt. Vernon	20	20	0	0	12	12	7	7.00
156	West Liberty	20	20	0	0	12	12	7	7.00
157	Tipton	20	20	0	0	12	12	7	7.00
158	Wilton	30	30	0	0	12	12	7	7.00
159	Durant	20	20	0	0	9	9	7	7.00
160	Walcott	20	20	0	0	9	9	7	7.00
161	West Branch	20	20	0	0	9	9	7	7.00
162	Lisbon	20	20	0	0	9	9	7	7.00

TABLE VI-3

MUNICIPAL DISCHARGER RANKING

RANK	MUNICIPALITY	DISCHARGE CRITERIA						SEGMENT POINTS	PRIORITY POINTS
		A_1	A_2	B_1	B_2	D_1	D_2		
163	Nichols	20	20	0	0	5	5	7	7.00
164	Stanwood	20	20	0	0	5	5	7	7.00
165	Bennett	20	20	0	0	5	5	7	7.00
166	Stockton	30	30	0	0	3	5	7	7.00
167	Atalissa		N E M T F					7	7.00
168	Manly	60	30	0	0	14	9	6	6.00
169	Nora Springs	30	40	0	0	9	9	6	6.00
170	Rockford	20	20	0	0	9	9	6	6.00
171	Rudd		N E M T F					6	6.00
172	Kensett		N E M T F					6	6.00
173	Wapello	20	20	0	0	9	9	5	5.00
174	Morning Sun	20	20	0	0	9	9	5	5.00
175	Ainsworth		N E M T F					5	5.00
176	Letts		N E M T F					5	5.00
177	Oakville		N E M T F					5	5.00
178	Grandview		N E M T F					5	5.00
179	Columbus City		N E M T F					5	5.00
180	Fredonia		N E M T F					5	5.00
181	Marble Rock	20	20	0	0	7	7	4	4.00
182	Fairfax	20	20	0	0	7	7	3	3.00
183	Keystone	20	20	0	0	7	7	3	3.00
184	Blairstown	30	30	0	0	5	7	3	3.00
185	Norway	30	30	0	0	5	5	3	3.00
186	Ladora	20	20	0	0	5	5	2	2.00
187	Malcom	30	30	0	0	3	5	2	2.00

TABLE VI-4

WASTE LOAD REDUCTIONS

Discharger	Ref. No.	Present Flow (mgd)	Present Lbs. Eff. BOD_5/NH_3	Projected (1990) Flow (mgd)	Projected (1990) Lbs. Eff. BOD_5/NH_3	Load Reduction BOD_5/NH_3
Iowa River						
Crystal Lake	M-1	NEMTF	--	0.033	8/4	a/a
Garner	M-2	0.181	P.S.	C.D.		--
Klemme	M-3	0.045	P.S.	C.D.		--
Goodell	M-4	NEMTF	--	0.027	7/3	a/a
Belmond	M-5	0.320	67/27	0.031	40/5	27/22
Central Soya	I-5	0.216	40/NA	0.216	40/NA	0/a
Rowan	M-6	NEMTF	--	0.025	6/3	a/a
Dows	M-8	0.067	17/8	0.085	7/1	10/7
Alden	M-10	0.060	P.S.	C.D.		--
Iowa Falls	M-11	0.841	210/119	1.240	103/41	107/78
Farmland Foods	I-12	0.450	P.S.	C.D.		--
Steamboat Rock	M-12	0.023	10/4	0.019	5/2	5/2
Eldora	M-13	0.147	31/18	0.600	150/40	b/b
Eldora Reform.	M-14	0.175	76/16			
Williams	M-15	0.055	P.S.	C.D.		--
Union	M-18	0.049	P.S.	C.D.		--
Liscomb	M-20	0.016	P.S.	C.D.		--
Radcliffe	M-21	0.038	P.S.	C.D.		--
Hubbard	M-22	0.085	P.S.	C.D.		--
New Providence	M-23	NEMTF	--	0.022	6/3	a/a
Zearing	M-24	0.054	P.S.	C.D.		--
St. Anthony	M-25	NEMTF	--	0.113	28/14	a/a
Clemons	M-26	0.038	P.S.	C.D.		--
Albion	M-27	0.038	P.S.	C.D.		--
Segment Total			451/192		400/116	149/107
Iowa River						
Marshalltown	M-28	3.756	783/345	5.217	435/87	248/258
State Center	M-29	0.162	36/14	0.207	52/26	b/b

TABLE VI-4

WASTE LOAD REDUCTIONS

		Present		Projected (1990)		Load
Discharger	Ref. No.	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Reduction BOD_5/NH_3
Haverhill	M-30	NEMTF	--	0.025	6/3	a/a
Gilman	M-31	0.033	P.S.	C.D.		--
Ferguson	M-32	NEMTF	--	0.032	8/4	a/a
LeGrand	M-33	0.059	P.S.	C.D.		--
Montour	M-34	0.021	P.S.	C.D.		--
Garwin	M-35	0.031	12/3	0.066	17/8	b/b
Toledo	M-36	0.200	43/12	0.300	75/38	b/b
Packaging Corp. of America	I-24	1.000	42/4	1.000	42/4	0/0
Tama	M-37	0.280	166/33	0.355	89/30	77/3
Tama Meat Packing Corp.	I-25	0.770	P.S.	C.D.		--
Chelsea	M-38	NEMTF	--	0.044	11/6	a/a
Clutier	M-39	0.027	P.S.	C.D.		--
Dysart	M-40	0.110	31/18	0.226	57/28	b/b
Elberon	M-41	NEMTF	--	0.023	6/3	a/a
Belle Plaine	M-43	0.205	43/17	0.174	43/22	0/b
Marengo	M-51	0.224	P.S.	C.D.		--
W.Amana S.D.	M-52	NEMTF	--	NA		a/a
Homestead S.D.	M-53	0.027	P.S.	C.D.		--
Amana S.D.	M-54	0.115	P.S.	C.D.		--
Walford	M-55	NEMTF	--	0.085	21/11	a/a
Swisher	M-56	0.039	8/3	0.065	16/8	b/b
Ely	M-57	0.028	P.S.	C.D.		--
Shueyville	M-58	NEMTF	--	0.029	7/4	a/a
Solon	M-59	0.086	20/7	0.134	33/17	b/b
Segment Total			1,567/648		918/299	325/261
Iowa River						
Iowa City Westinghouse	M-60	0.005	P.S.	C.D.		--

TABLE VI-4

WASTE LOAD REDUCTIONS

		Present		Projected (1990)		Load
Discharger	Ref. No.	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Reduction BOD_5/NH_3
North Liberty	M-61	0.161	47/27	0.235	59/29	b/b
Oxford	M-62	0.044	9/4	0.116	29/15	b/b
Tiffin	M-63	0.029	6/2	0.052	13/7	b/b
Coralville	M-64	1.074	278/179	2.650	663/332	b/b
Iowa City Main Plant	M-65	6.276	1,308/523	10.569	1,588/618	b/b
Hills	M-66	0.055	11/5	0.090	23/11	b/b
Lone Tree-N	M-68	0.018	P.S.		C.D.	--
Lone Tree-S	M-69	0.065	P.S.		C.D.	--
Conesville	M-82	0.043	P.S.		C.D.	--
Rath Packing Plant	I-42	0.525	197/330	0.525	109/NA	88/NA
Columbus Jct.	M-84	0.120	P.S.		C.D.	--
Segment Total			1,856/1,070		2,484/1,012	88/0
Iowa River						
Fredonia	M-206	NEMTF	--	0.023	6/3	a/a
Ainsworth	M-207	NEMTF	--	0.050	13/6	a/a
Columbus City	M-208	NEMTF	--	0.044	11/6	a/a
Letts	M-209	NEMTF	--	0.062	15/8	a/a
Grandview	M-210	NEMTF	--	0.050	13/6	a/a
Wapello	M-211	0.187	P.S.		C.D.	--
Morning Sun	M-212	0.091	P.S.		C.D.	--
Segment Total			0/0		58/29	0/0
Bear Creek						
Malcom	M-47	0.015	P.S.		C.D.	--
Brooklyn	M-48	0.097	32/16	0.103	9/2	23/14
Victor	M-49	0.083	19/7	0.078	7/1	12/6
Ladora	M-50	0.032	P.S.		C.D.	--
Segment Total			51/23		16/3	35/20

TABLE VI-4

WASTE LOAD REDUCTIONS

		Present		Projected (1990)		Load
Discharger	Ref. No.	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Reduction BOD_5/NH_3
Old Mans Creek						
Williamsburg	M-67	0.181	45/23	0.242	20/4	25/19
Segment Total			45/23		20/4	25/19
English River						
Deep River	M-71	NEMTF	--	0.036	9/5	a/a
Millersburg	M-72	NEMTF	--	0.022	6/3	a/a
North English	M-73	0.132	39/22	0.118	10/2	29/20
Keswick	M-76	NEMTF	--	0.030	8/4	a/a
South English	M-77	NEMTF	--	0.025	6/3	a/a
Wellman	M-79	0.107	27/9	0.169	14/3	13/6
TwinCty. Dairy	I-40	0.015	13/0.4	0.015	4/2	9/b
Kalona	M-80	0.631	P.S.	C.D.		--
Riverside	M-81	0.045	9/4	0.103	9/2	0/2
Segment Total			88/35.4		57/24	51/28
Cedar River						
St. Ansgar	M-86	0.090	P.S.	C.D.		--
Mitchell	M-87	NEMTF	--	0.026	7/3	a/a
Osage	M-88	0.269	114/67	0.340	85/43	29/24
Orchard	M-89	0.011	3/1	0.011	3/1	0/0
Grafton	M-90	NEMTF	--	0.032	8/4	a/a
Floyd	M-91	0.060	P.S.	C.D.		--
Charles City	M-92	1.882	879/659	1.823	456/228	433/431
Farmer's Co-op Creamery	I-45	0.015	170/NA	c	c/c	--
Nashua	M-93	0.135	88/32	0.135	34/17	54/15
Stacyville	M-94	0.025	6/2	0.027	7/4	b/b
Plainfield	M-97	0.010	P.S.	C.D.		--
Waverly	M-98	0.639	176/107	0.665	167/83	9/24

TABLE VI-4

WASTE LOAD REDUCTIONS

		Present		Projected (1990)		Load
Discharger	Ref. No.	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Reduction BOD_5/NH_3
Denver	M-99	0.062	P.S.		C.D.	--
Janesville	M-100	0.030	63/8	0.039	10/5	53/3
Segment Total			1,382/808		531/388	551/497
Cedar River						
Cedar Falls (Main Plant)	M-147	3.717	775/155	5.365	1,342/671	b/b
Cedar Falls (Cedar Hts.)	M-148	0.050	13/4	0.050	13/6	0/b
John Deere Co.	I-81 I-88	37.480	d/d	37.480	d/d	0/0
Pepsi-Cola Bottling	I-82	0.013	13/NA	c	c/c	--
Waterloo	M-155	14.959	5,614/3,119	21.720	1,811/362	3,803/2,757
Evansdale	M-156	0.470	98/27	0.562	141/70	b/b
Elk Run Hts.	M-157	0.057	12/5	0.150	37/19	b/b
Raymond	M-158	NEMTF	--	0.091	23/11	a/a
Gilbertville	M-159	NEMTF	--	0.103	26/13	a/a
Jesup	M-166	0.332	69/28	0.327	27/5	67/23
Brandon	M-167	0.024	5/2	0.054	13/7	b/b
Mt. Auburn	M-168	0.020	P.S.		C.D.	--
Garrison	M-170	0.028	P.S.		C.D.	--
Vinton	M-171	1.172	811/293	1.171	293/147	518/146
Urbana	M-172	0.055	P.S.		C.D.	--
Walker	M-173	0.050	P.S.		C.D.	--
Center Point	M-174	0.121	44/20	0.248	62/31	b/b
Shellsburg	M-175	0.074	31/15	0.095	24/12	7/3
Newhall	M-176	0.035	P.S.		C.D.	--
Atkins	M-177	0.037	11/6	0.075	19/9	b/b
Palo	M-178	0.043	22/11	0.073	18/9	4/2
Robins	M-179	NEMTF	--	0.113	28/14	a/a
Penick & Ford	I-118	2.180	273/NA	c	c/c	--

TABLE VI-4

WASTE LOAD REDUCTIONS

Discharger	Ref. No.	Present Flow (mgd)	Present Lbs. Eff. BOD_5/NH_3	Projected (1990) Flow (mgd)	Projected (1990) Lbs. Eff. BOD_5/NH_3	Load Reduction BOD_5/NH_3
Cargill-16th St.	I-120	2.540	530/NA	c	c/c	--
Cedar Rapids						
Main Plant	M-181	25.535	20,018/11,713	39.522	9,889/1,648	11,114/10,507
Indian Creek	M-189	4.074	985/442			
Alburnett	M-187	0.042	P.S.	C.D.		--
Springville	M-190	0.175	77/29	0.168	42/21	35/8
Martelle	M-191	NEMTF	--	0.043	11/5	a/a
Bertram	M-192	NEMTF	--	0.030	8/4	a/a
Segment Total			29,388/15,869		13,827/3,064	15,548/13,446
Cedar River						
Lisbon	M-193	0.131	27/11	0.229	57/29	b/b
Mt. Vernon	M-194	0.370	77/31	0.609	153/76	b/b
Stanwood	M-195	0.040	9/3	0.085	21/11	b/b
Tipton	M-196	0.322	67/27	0.417	104/52	b/b
Bennett	M-197	0.031	P.S.	C.D.		--
Walcott	M-198	0.140	P.S.	C.D.		--
Stockton	M-199	0.019	P.S.	C.D.		--
Durant	M-200	0.201	42/17	0.247	62/31	b/b
Wilton	M-201	0.295	81/49	0.410	103/51	b/b
West Liberty	M-202	0.345	86/29	0.375	94/47	b/b
West Branch	M-203	0.132	32/11	0.209	52/26	b/b
Atalissa	M-204	NEMTF	--	0.039	10/5	a/a
Nichols	M-205	0.042	P.S.	C.D.		--
Segment Total			421/178		656/328	--
W.Fk. Cedar River						
Clear Lake S.D.	M-133	1.696	354/141	2.153	179/36	175/105
Swaledale	M-101	NEMTF	--	0.026	7/3	a/a
Rockwell	M-102	0.085	59/11	0.097	24/12	35/b
Thornton	M-103	0.037	P.S.	C.D.		--
Meservey	M-104	NEMTF	--	0.043	11/5	a/a

TABLE VI-4

WASTE LOAD REDUCTIONS

Discharger	Ref. No.	Present		Projected (1990)		Load Reduction
		Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	BOD_5/NH_3
Sheffield	M-105	0.181	P.S.	C.D.		--
Dumont	M-106	0.304	P.S.	C.D.		--
Alexander	M-107	NEMTF	--	0.027	7/3	a/a
Latimer	M-108	NEMTF	--	0.043	11/5	a/a
Hampton	M-110	0.585	161/39	0.425	107/18	54/21
Bristow	M-112	NEMTF	--	0.029	7/4	a/a
Coulter	M-113	NEMTF	--	0.029	7/4	a/a
Geneva	M-114	NEMTF	--	0.022	6/3	a/a
Allison	M-115	0.099	P.S.	C.D.		--
Segment Total			574/191		366/93	264/126
Shell Rock River						
Northwood	M-116	0.161	57/15	0.181	45/23	2/b
Kensett	M-117	NEMTF	--	0.047	12/6	a/a
Manly	M-118	0.129	P.S.	C.D.		--
Nora Springs	M-121	0.116	36/24	0.209	52/26	b/b
Rockford	M-122	0.090	P.S.	C.D.		--
Segment Total			83/39		109/55	2/0
Shell Rock River						
Marble Rock	M-135	0.046	P.S.	C.D.		--
Greene	M-136	0.136	54/37	0.116	29/15	25/22
Rudd	M-138	NEMTF	--	0.058	15/7	a/a
Clarksville	M-139	0.092	57/13	0.176	44/22	13/b
Shell Rock	M-140	0.116	49/23	0.097	24/12	25/11
Segment Total			160/73		112/56	63/33
Winnebago River						
Thompson	M-124	NEMTF	--	0.066	17/8	a/a
Leland	M-125	0.022	P.S.	C.D.		--
Forest City-E	M-126	0.337	70/20	0.700	58/12	40/14
Forest City-SW	M-127	0.132	28/6			
Lake Mills	M-128	0.231	71/39	0.158	13/3	58/36

TABLE VI-4

WASTE LOAD REDUCTIONS

Discharger	Ref. No.	Present Flow (mgd)	Present Lbs. Eff. BOD_5/NH_3	Projected (1990) Flow (mgd)	Projected (1990) Lbs. Eff. BOD_5/NH_3	Load Reduction BOD_5/NH_3
Fertile	M-129	NEMTF	--	0.050	13/6	a/a
Joice	M-130	NEMTF	--	0.025	6/3	a/a
Hanlontown	M-131	NEMTF	--	0.029	7/4	a/a
Armour & Co.	I-65	0.640	480/NA	c	c/c	--
Mason City	M-134	4.920	1,108/369	6.510	543/163	565/206
Segment Total			1,757/434		657/199	663/256
Beaver Creek						
Ackley	M-141	0.189	44/16	0.212	18/11	26/5
Aplington	M-142	0.053	18/8	0.062	5/3	b/5
Wellsburg	M-143	0.040	23/10	0.045	11/6	12/4
Parkersburg	M-144	0.160	P.S.		C.D.	--
Stout	M-145	NEMTF	--	0.025	6/3	a/a
New Hartford	M-146	0.069	P.S.		C.D.	--
Segment Total			85/34		40/23	38/14
Black Hawk Creek						
Holland	M-149	0.026	P.S.		C.D.	--
Grundy Center	M-150	0.355	148/36	0.472	39/8	109/28
Reinbeck	M-152	0.212	126/28	0.300	25/5	101/23
Reinbeck Canning Co.	I-85	0.160	NA/NA	NA	NA/NA	--
Dike	M-153	0.137	37/23	0.094	23/12	14/11
Hudson	M-154	0.149	178/25	0.286	71/12	107/13
Segment Total			489/112		158/37	331/75
Wolf Creek						
Conrad	M-160	0.050	12/4	0.058	5/2	7/2
Beaman	M-161	NEMTF	--	0.029	7/4	a/a
Gladbrook	M-162	0.098	P.S.		C.D.	--
Traer	M-164	0.141	58/29	0.155	39/12	19/17
LaPorte City	M-165	0.226	58/38	0.271	68/20	b/18
Segment Total			128/183		119/38	26/37

TABLE VI-4

WASTE LOAD REDUCTIONS

Discharger	Ref. No.	Present		Projected (1990)		Load Reduction
		Flow (mgd)	Lbs. Eff. BOD_5/NH_3	Flow (mgd)	Lbs. Eff. BOD_5/NH_3	BOD_5/NH_3
Prairie Creek						
Keystone	M-182	0.047	P.S.		C.D.	--
Van Horne	M-183	0.034	9/6	0.079	7/1	2/5
Blairstown	M-184	0.033	P.S.		C.D.	--
Norway	M-185	0.027	P.S.		C.D.	--
Fairfax	M-186	0.064	P.S.		C.D.	--
Segment Total			9/6		7/1	2/5
Mississippi River						
Mediapolis	M-214	0.120	P.S.		C.D.	--
Burlington	M-215	3.24	1,324/676	3.564	892/446	432/230
W.Burlington	M-216	0.451	102/38	0.537	135/67	b/b
Segment Total			1,426/714		1,027/513	432/230

a = Load Increased Due to Anticipated Construction of New STP.

b = Load Increased Due to Projected Increase in Population and/or Flows.

c = To Connect to Municipal Sewer System.

d = Cooling Water - No BOD or NH_3 Added.

P.S. - Partial Storage

C.D. - Controlled Discharge

REFERENCES

1. Supporting Document For Iowa Water Quality Management Plans, Iowa Department of Environmental Quality, Water Quality Management Division, Des Moines, Iowa 1976.

CHAPTER VII

NONPOINT POLLUTION SOURCES

Flow contributions into surface waters from sources other than readily identified domestic, industrial, and semi-public point source discharges may have a substantial impact on water quality in some situations. The utility of the water resource may be adversely affected by nonpoint discharges associated with combined sewer overflows, urban and rural runoff, and agricultural waste.

Compilations of local data identifying these pollution vectors were minimal; therefore, extrapolation of data from other locations has been necessary. Remedial measures and construction programs to deal with these problems also frequently lack the clear definition possible for point source pollution abatement programs.

For purposes of this study, the nonpoint pollution sources have been divided into the following three main areas:

1. General rural runoff
2. Animal feeding operations
3. Urban nonpoint wastes

Animal feeding operations are sometimes classified as point sources of pollution. However, since a large majority of livestock in the study area are located in small feeding operations and operated as a part of a total farming operation, an analysis of feeding operations has been included in this chapter.

GENERAL RURAL RUNOFF

Approximately 92 percent of the Iowa-Cedar River Basin is classified as agricultural land.

Table VII-1 presents a tabulation of the agricultural, non-agricultural, and total land within each of several sub-basins.

Method of Analysis

Due to the complexity of the general rural runoff problem, quantitative values which identify the pollution load are difficult to obtain and evaluate. The most realistic approach is to define losses in terms of pounds of material lost per acre per year. Due to limited data regarding BOD and COD potentials from cropland, this study has only attempted to quantify the sediment and nutrient loadings.

An analysis was conducted to estimate sediment and nutrient loadings upon the streams in the basin.

Typical nitrogen and phosphorus runoff from cropland have been identified as 10 and 0.3 pounds per acre per year, respectively. These values can vary with both type of crop and cropland. Pasture, forest, and other land uses display negligible pollution potentials in terms of nitrogen and phosphorus (1, 2, 3, 4, 5, 6, 7, 9).

TABLE VII-1

LAND USE CLASSIFICATIONS

Sub-basin	LAND AREA IN ACRES				
	Cropland	Pasture, Range & Forest	Total Agricultural	Non-Agricultural	Total
Shell Rock River	789,184	83,752	872,936	70,723	943,659
West Fork Cedar River	574,085	70,353	644,438	49,826	694,264
Cedar River above confluence with West Fork	502,302	65,194	567,496	41,607	609,103
Cedar River below confluence with West Fork	1,645,445	278,947	1,924,392	193,730	2,118,122
Iowa River above confluence with Cedar	2,212,251	357,171	2,569,422	247,483	2,816,905
Iowa River below confluence with Cedar	154,163	54,480	208,643	20,285	228,928
TOTAL	5,877,430	909,897	6,787,327	623,654	7,410,981

Potential nutrient pollution in the Iowa-Cedar River Basin was determined by assuming 10 and 0.3 lbs/acre/yr. of nitrogen and phosphorus, respectively, would run off the cropland acreages in each watershed. The resulting nutrient pollution potential reported by sub-basin is presented in Table VII-2.

General Rural Runoff Treatment Costs

It has been estimated that 87 percent of the basin's agricultural land has problems that either restrict its use and/or has a need for measures to preserve the resource. These problems include erosion, sediment, and floodwater damages.

Total capital and annual costs for implementing conservation treatment practices are presented in Table VII-3. (Unit costs were provided by the Soil Conservation Service). Proposed treatment practices generally have been shown to reduce the gross sediment loss by 20 to 30 percent. This would amount to between 8.47 and 12.71 million tons of soil per year at an annual unit cost of between $2.50 and $4.00 per ton of sediment retained on the land.

TABLE VII-2

POTENTIAL NUTRIENT CONTRIBUTION

Sub-basin	Cropland (acres)	Pollution Potential Nitrogen (tons/year)	Pollution Potential Phosphorus (tons/year)
Shell Rock River	789,184	3,946	118
West Fork Cedar River	574,085	2,870	86
Cedar River above confluence with West Fork	502,302	2,512	75
Cedar River below confluence with West Fork	1,645,445	8,227	247
Iowa River above confluence with Cedar	2,212,251	11,061	332
Iowa River below confluence with Cedar	154,163	771	23

TABLE VII-3

GENERAL RUNOFF TREATMENT COSTS*

Sub-basin	Total Costs	
	Capital	Annual**
Shell Rock River	$ 45,927,233	$ 5,344,171
West Fork Cedar River	34,133,799	4,305,989
Cedar River above confluence with West Fork	26,379,599	2,900,370
Cedar River below confluence with West Fork	56,646,086	7,501,124
Iowa River above confluence with Cedar	100,233,406	12,978,632
Iowa River below confluence with Cedar	5,801,296	741,184
TOTAL	$269,121,419	$33,771,470

* 1974 Dollars

** Represents annual maintenance costs and capital costs amortized at 7% for 20 years.

Although complete retention of the soil is not feasible, the unit cost to reduce sediment contributions to the streams is relatively minor. Achieving such reductions can result in substantial water quality improvement without sacrificing agricultural production levels.

Animal Waste Inventory

Animal production operations may be a major source of pollution due to the concentration of animals in a restricted area. In an effort to define the size and location of such facilities in the basin, information was gathered on feeding operations registered with DEQ. To establish the number and distribution of animals in the basin, livestock census information was obtained from the Iowa Annual Farm Census, 1971, published by the Iowa Department of Agriculture.

The distribution of animals in the basin is presented in Table VII-5. Information on feeding operations registered with DEQ is presented in Table VII-6 and their locations are shown on Figure VII-1.

Animal Feeding Operation Pollution Abatement Costs

To indicate the relative magnitude of waste treatment costs for feeding operations in the basin, capital cost estimates have been developed for treatment systems for both cattle and swine operations. Most feeding operations in the basin, registered with DEQ, presently have adequate treatment facilities. For purposes of this cost estimate, it was necessary to approximate the number of unregistered beef cattle and swine which are confined in feeding operations that require treatment facilities. Testimony given before a U. S. House of Representatives subcommittee (24) estimates that 22 percent of the swine operations and 26 percent of the beef cattle feeding operations in the United States have pollution problems requiring remedial measures.

Treatment costs presented in Table VII-7 reflect the above percentages of unregistered animals in the basin and treatment costs from EPA (25).

TABLE VII-4

ANIMAL DISTRIBUTION *

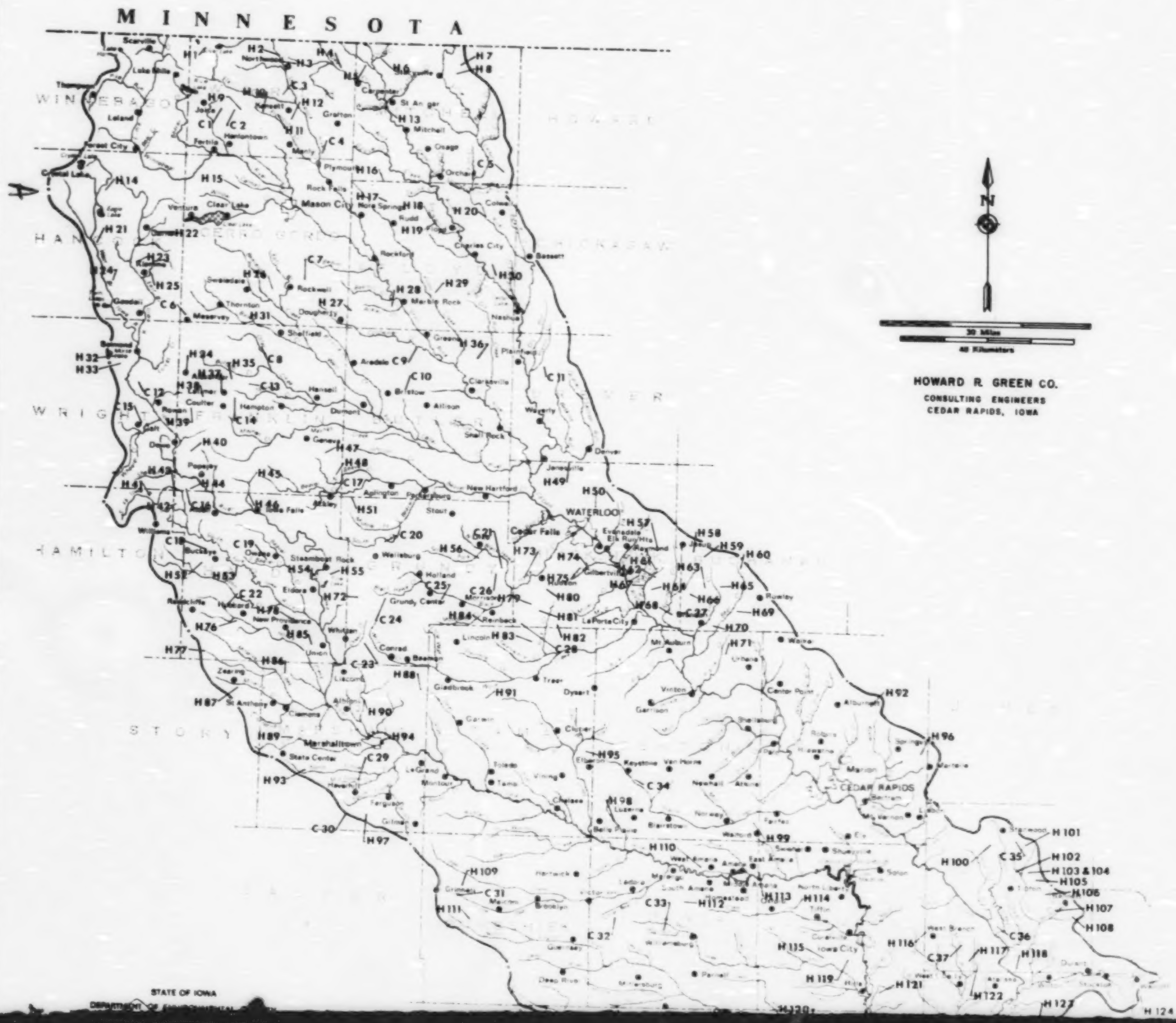
Sub-basin	Cattle	Swine	Sheep	Poultry
Shell Rock River	41,530	413,907	7,537	353,525
West Fork Cedar River	51,196	401,017	11,388	391,218
Cedar River above confluence with West Fork	43,145	283,129	5,263	415,976
Cedar River below confluence with West Fork	198,479	1,203,282	34,485	765,536
Iowa River above confluence with Cedar	278,708	1,794,874	48,851	1,288,833
Iowa River below confluence with Cedar	10,195	121,348	2,353	77,171
TOTAL	623,253	4,217,557	109,877	3,292,259

* Approximate 1971 Distribution

TABLE VII-5

ANIMAL FEEDING OPERATIONS; IOWA-CEDAR RIVER BASIN

Registration No.	County	No. of Animals	Ref. No.	Type Controls*
		SWINE FEEDING OPERATIONS		
2-06-00-4-01	Benton	224	H-71	ST
" -02		300	None	ST
" -03		380	H-99	ST
" -04		216	H-98	ST
2-07-00-4-01	Black Hawk	500	H-75	ST
" -02		150	H-73	ST
" -03		400	H-68	ST
" -04		450	H-50	ST
" -06		560	H-81	ST
" -07		600	None	ST
" -08		530	None	ST
" -09		320	H-64	ST
" -10		400	H-61	ST
" -11		300	H-62	ST
" -12		22	H-80	ST
" -13		350	H-79	ST
" -14		1660	H-57	SL
" -15		298	H-74	ST
" -16		331	H-67	ST
" -17		350	H-82	ST
2-09-00-4-02	Bremer	250	H-49	ST
2-10-00-4-03	Buchanan	224	H-65	ST
" -04		536	H-70	ST
" -05		220	H-60	ST
" -06		20	H-66	ST
" -12		320	H-63	ST
" -14		260	H-69	ST
" -16		300	H-58	ST
" -17		432	H-59	SL
2-12-00-4-01	Butler	180	H-51	ST
" -02		400	H-36	ST


MINNESOTA
WINNEBAGO
HANCOCK
CERRO GORDO
WRIGHT
FRANKLIN
BUTLER
HAMILTON
HARDIN
GRUNDY
STORY
MARSHALL
TAMA
BENTON
BLACK HAWK
BUCHANAN
BREMER
CHICKASAW
FLOYD
MITCHELL
HOWARD
WORTH
LINN
JONES
POWESHIEK
IOWA
JOHNSON
CEDAR
MASON CITY
WATERLOO
Cedar Falls
CEDAR RAPIDS
Iowa City
Charles City
Marshalltown
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30 Miles
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HOWARD R. GREEN CO.
CONSULTING ENGINEERS
CEDAR RAPIDS, IOWA
STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL
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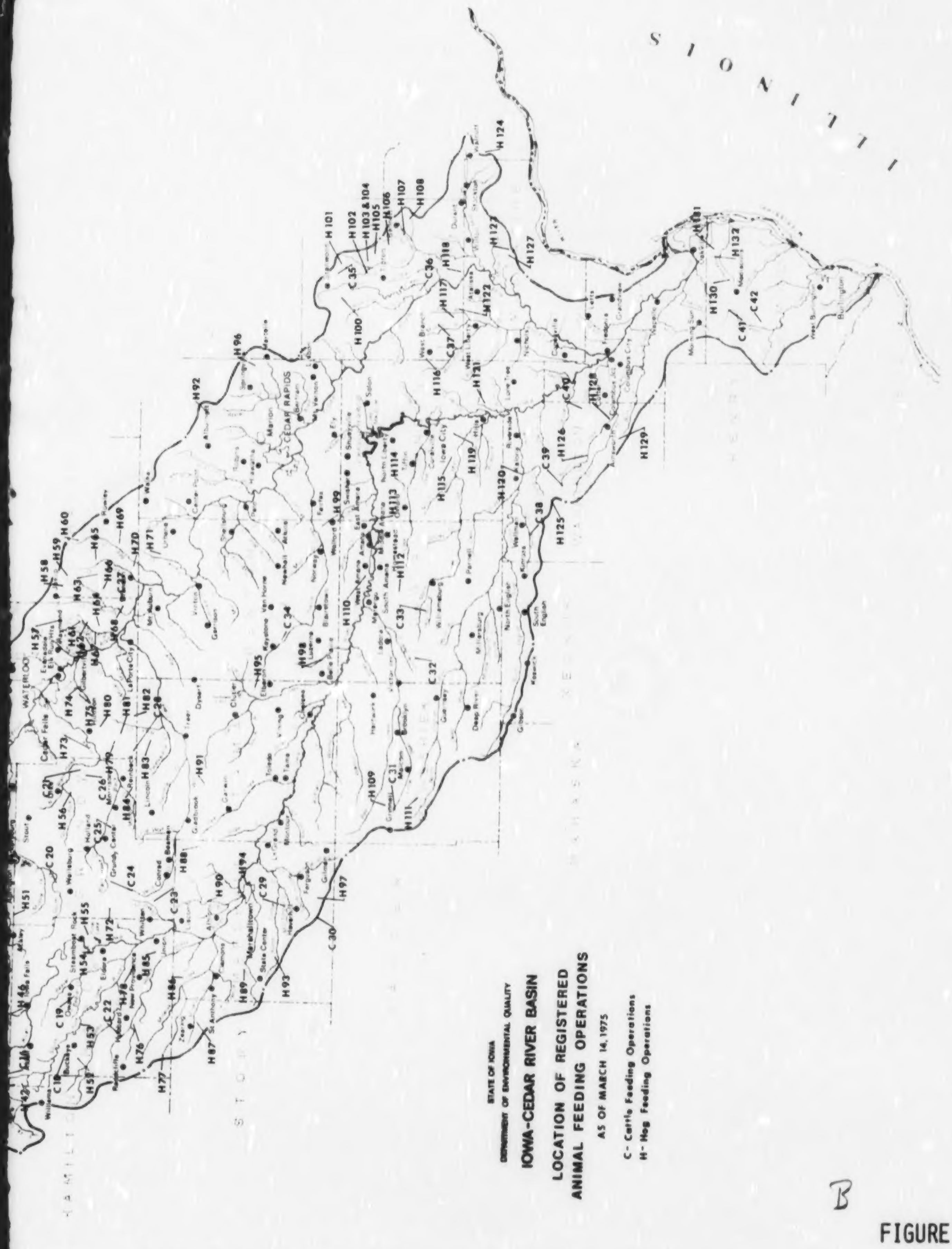
STATE OF IOWA
DEPARTMENT OF ENVIRONMENTAL QUALITY
IOWA-CEDAR RIVER BASIN

LOCATION OF REGISTERED ANIMAL FEEDING OPERATIONS

AS OF MARCH 14, 1975

C- Cattle Feeding Operations
H- Hog Feeding Operations

ILLINOIS
WATERLOO
Cedar Falls
CEDAR RAPIDS
Iowa City
Marshalltown
Burlington
HAMILTON
STORY
H101
H102
H103 & 104
H105
H106
H107
H108
H124
H127
H131
H132
H130
C41
C42
C35
C36
H100
H118
H117
H122
C37
H116
H121
H128
C40
H126
C39
H129
H125
C38
H120
H119
H115
H114
H113
H112
H99
H96
H92
H60
H59
H58
H57
H69
H65
H66
H63
H70
H71
C27
H64
H61
H68
H62
H67
H74
H75
H80
H81
H82
C28
H73
C21
H79
C26
H83
H84
H56
C25
H91
H88
C20
C24
H51
H55
H72
C23
H90
H94
C29
H97
C30
H93
H89
H85
H86
H87
H46
C19
C22
H53
H54
H78
H76
H77
H52
C18
H109
C31
H111
C32
H110
C33
C34
H95
H98

B

FIGURE VII-1

TABLE VII-5 (CONTINUED)

Registration No.	County	No. of Animals	Ref. No.	Type Controls*
2-16-00-4-02	Cedar	20	H-122	ST
" -03		250	H-100	ST
" -04		350	H-102	ST
" -05		264	H-103	ST
" -06		32	H-101	ST
" -07		320	H-108	ST
" -08		420	H-116	ST
" -09		12	H-106	ST
" -12		174	H-118	ST
" -13		600	H-117	ST
" -14		756	H-105	SL
" -15		1825	H-104	SL
" -16		325	None	ST
" -17		360	H-107	ST
2-17-00-4-01	Cerro Gordo	N/A	None	N/A
" -02		146	H-31	ST
" -03		N/A	None	N/A
" -04		5460	H-15	SL
" -05		480	H-26	ST
2-29-00-4-01	Des Moines	2800	H-132	SL
" -03		720	H-131	ST
" -04		600	H-130	ST
2-34-00-4-01	Floyd	451	H-20	ST
" -02		112	H-18	ST
" -03		325	H-29	ST
" -04		1470	H-30	SL
" -05		1165	H-27	RC
" -06		16	H-19	ST
" -07		500	H-17	ST
" -08		28	H-28	ST
2-35-00-4-01	Franklin	300	H-44	RC
" -02		380	H-38	ST
" -03		1200	H-37	ST
" -04		400	H-34	ST
" -05		240	H-35	ST
" -06		800	H-40	ST
" -07		250	H-39	ST
" -08		2700	H-48	SL

TABLE VII-5 (CONTINUED)

Registration No.	County	No. of Animals	Ref. No.	Type Controls*
2-35-00-4-09	Franklin	600	H-47	ST
" -10		2448	H-46	ST
" -11		948	H-45	ST
2-38-00-4-01	Grundy	280	H-72	ST
" -02		440	H-84	ST
" -03		360	H-56	SL
2-40-00-4-01	Hamilton	512	H-41	ST
2-41-00-4-01	Hancock	300	H-25	ST
" -03		2000	H-21	SL
" -05		400	H-23	ST
" -06		340	H-22	ST
" -07		450	H-14	ST
" -08		320	H-24	ST
2-42-00-4-01	Hardin	560	H-54	ST
" -02		420	H-55	ST
" -03		300	H-52	ST
" -04		5100	H-85	SL
" -05		250	H-42	ST
" -06		2680	H-78	SL
" -07		1200	H-53	ST
" -08		800	H-77	ST
" -09		250	H-43	ST
" -10		850	H-76	ST
2-48-00-4-01	Iowa	420	H-112	ST
" -02		850	H-110	ST
2-52-00-4-01	Johnson	292	H-121	ST
" -02		250	H-114	ST
" -03		480	H-115	ST
" -04		900	H-113	ST
" -05		80	H-119	SL
2-57-00-4-01	Linn	73	H-96	ST
" -02		375	H-92	ST
2-58-00-4-01	Louisa	600	None	SL
2-64-00-4-01	Marshall	350	H-94	ST
" -02		280	H-86	ST
" -03		24	H-89	ST
" -04		240	H-90	ST
" -06		900	H-97	SL

TABLE VII-5 (CONTINUED)

Registration No.	County	No. of Animals	Ref. No.	Type Controls*
2-64-00-4-07	Marshall	20	H-93	ST
" -08		600	H-88	ST
2-66-00-4-01	Mitchell	300	H-16	ST
" -02		700	H-13	ST
" -03		960	H-5	RC
" -04		250	H-8	ST
" -05		250	H-7	ST
2-70-00-4-01	Muscatine	400	H-123	ST
" -02		1170	H-127	SL
2-79-00-4-01	Poweshiek	250	H-111	ST
" -03		680	H-109	ST
2-82-00-4-01	Scott	400	H-124	ST
2-85-00-4-06	Story	1000	H-87	ST
2-86-00-4-01	Tama	50	H-83	ST
" -02		650	H-91	ST
" -03		400	H-95	ST
2-92-00-4-01	Washington	384	H-126	ST
2-92-33-4-02		360	H-120	ST
2-92-03-4-03		250	H-128	ST
2-92-00-4-04		770	H-125	ST
" -06		1870	H-129	SL
2-98-00-4-01	Worth	341	H-4	ST
" -02		1150	H-10	ST
" -03		420	H-9	ST
" -04		220	H-12	ST
" -05		350	H-3	ST
" -06		300	H-6	ST
" -07		450	H-11	ST
" -08		2000	H-2	SL
" -09		750	H-1	NC
2-99-00-4-01	Wright	500	H-32	RC
" -05		790	H-33	RC

* SB - Storage Basin
SL - Lagoon
RC - Runoff Controls

* ST - Below Building Storage or Tank
NC - No Controls
NA - Not Available

TABLE VII-5 (CONTINUED)

Registration No.	County	No. of Animals	Ref. No.	Type Controls*
BEEF FEEDING OPERATIONS				
2-06-00-0-01	Benton	400	C-34	RC
" -02		N/A	None	N/A
2-07-00-0-01	Black Hawk	4000	C-28	NC
" -02		N/A	None	N/A
" -03		N/A	None	N/A
" -04		40	None	ST
" -05		200	C-27	ST
2-09-00-0-01	Bremer	50	C-11	ST
2-12-00-0-01	Butler	300	C-10	RC
" -02		150	C-8	NC
2-16-00-0-01	Cedar	N/A	None	N/A
" -02		500	C-37	ST
" -03		200	C-36	ST
" -04		400	C-35	NC
2-17-00-0-01	Cerro Gordo	1500	C-6	RC
" -02		N/A	None	N/A
" -03		N/A	None	N/A
" -04		300	C-7	ST
2-29-00-0-01	Des Moines	100	C-41	RC
" -02		N/A	None	RC
" -03		100	C-42	RC
" -04		N/A	None	N/A
2-34-00-0-01	Floyd	N/A	None	N/A
" -02		N/A	None	N/A
2-35-00-0-01	Franklin	600	C-8	RC
" -02		N/A	None	N/A
" -03		200	C-16	RC
" -04		270	C-17	ST
" -05		N/A	None	N/A
" -06		310	C-13	ST
" -07		350	C-14	RC
2-38-00-0-01	Grundy	2500	C-24	RC
" -02		3400	C-26	RC
" -03		500	C-23	RC
" -04		N/A	None	N/A
" -05		600	C-25	RC
" -06		530	C-21	ST

TABLE VII-5 (CONTINUED)

Registration No.	County	No. of Animals	Ref. No.	Type Controls*
2-38-00-0-07	Grundy	200	C-20	ST
2-42-00-0-01	Hardin	850	C-22	ST
" -02		1000	None	RC
" -03		8300	C-19	RC
" -04		N/A	None	N/A
" -05		N/A	None	N/A
" -06		600	C-18	RC
" -07		N/A	None	N/A
2-48-00-0-01	Iowa	N/A	None	RC
" -02		500	C-33	RC
" -03		320	C-32	ST
2-52-00-0-02	Johnson	N/A	None	N/A
2-64-00-0-02	Marshall	600	C-29	RC
" -03		375	C-30	ST
2-66-00-0-01	Mitchell	N/A	C-5	N/A
2-79-00-0-01	Poweshiek	400	C-31	ST
2-85-00-0-04	Story	N/A	None	N/A
2-92-00-0-01	Washington	1000	C-38	NC
" -02		300	C-40	RC
" -03		1000	C-39	ST
2-98-00-0-01	Worth	2000	C-1	NC
" -02		1800	C-4	RC
" -03		200	C-3	RC
" -04		120	C-2	NC
2-99-00-0-01	Wright	150	C-12	NC
" -02		600	C-15	ST

* SB - Storage Basin
SL - Lagoon
RC - Runoff Controls
ST - Below Building Storage or Tank
NC - No Controls
NA - Not Available

TABLE VII-6

LIVESTOCK TREATMENT COST*

Sub-basin	Capital Cost		
	Cattle	Swine	Total
Shell Rock River	$ 161,967	$ 1,092,714	$ 1,254,681
West Fork Cedar River	199,664	1,058,685	1,258,349
Cedar River above confluence with West Fork	168,265	747,460	915,725
Cedar River below confluence with West Fork	774,068	3,176,664	3,950,732
Iowa River above confluence with Cedar	1,086,961	4,738,467	5,825,428
Iowa River below confluence with Cedar	39,760	320,359	360,119
TOTAL	$2,430,685	$11,134,349	$13,565,034

* 1974 Dollars

URBAN RUNOFF

The impact of urban runoff upon the water environment is difficult to quantify based upon present information. This study has been directed toward developing from available technical literature, information which may be compared with other pollution problems and solutions attributable to various sources.

Cost estimates for collection and treatment of urban runoff have been developed by sub-basin and may be found in Table VII-8. A more complete discussion of urban runoff may be found in the Supporting Document for Iowa Water Quality Management Plans (29).

CONCLUSIONS

It is readily recognized that the surface water quality of the streams and lakes within the State is adversely affected during periods of surface runoff from agricultural and urban areas. Additional studies are needed, however, to determine the actual extent and nature of non-point source pollution.

TABLE VII-7

URBAN RUNOFF COLLECTION AND TREATMENT COSTS

Sub-basin	Treatment Cost * (Million $)
Shell Rock River	$ 54.83
West Fork Cedar River	19.08
Cedar River above confluence with West Fork	29.80
Cedar River below confluence with West Fork	291.73
Iowa River above Coralville Reservoir	75.87
Iowa River below Coralville Reservoir	115.18

* 1974 Dollars

REFERENCES

1. Minshall, N.E., Witzel, S.A., and Nichols, N.S., "Stream Enrichment from Farm Operations." Journal Sanitary Engineering Division, American Society of Civil Engineers, 26, 513, 1970.

2. Willrich, T.L. and Smith, G.E., Agricultural Practices and Water Quality. Iowa State University Press, Ames, Iowa, 94 and 231, 1970.

3. Nelson, Darrell W., "Purdue Research Concerned with the Effect of Fertilizers on Water Quality." Contribution to the 1971 Indiana Plant and Food Agricultural Chemicals Conference, December 13, 1971 at Lafayette, Indiana.

4. Barber, Stanley A. "Preventing Pollution from Fertilizer Use." Purdue University, Lafayette, Indiana.

5. Testimony of the Illinois Fertilizer and Chemical Association as Presented to the Illinois Pollution Control Board, August 4, 1971, Circle Campus, Chicago, Illinois.

6. Schwab, G.O., Taylor G.S., and Waldron, A.C., "Measure Pollutants in Agricultural Drainage." Ohio Report, 55 (4) 87-89, 1970.

7. Erickson, A.E. and Ellis, B.G., "The Nutrient Content of Drainage Water from Agricultural Land." Research Bulletin 31, Agricultural Experiment Station, Michigan State University, 1971.

8. Nelson, D.W., Stivers, R.K., and Romkens, M.J.M., "Loss of Nitrogen and Phosphorus from Indiana Soils by Leaching and Surface Runoff." Agronomy Department, Purdue University, Lafayette, Indiana.

9. Weidner, R.B., et al., "Rural Runoff as a Factor in Stream Pollution." Journal Water Pollution Control Federation, 41, 377, 1969.

10. Moore, W.R. and Smith, C.E., "Erosion Control in Relation to Watershed Management." Journal Irrigation and Drainage Division, American Society of Civil Engineers, 94, 321, 1968.

11. Smith, G.E., Statement to U. S. Senate Subcommittee on Air and Water Pollution, April, 1971.

12. Baumann, E.R. and Kelman, S., "Effects of Surface Runoff on the Feasibility of Municipal Advanced Waste Treatment." The Role of Agriculture in Clean Water Conference, Ames, Iowa, 1969.

13. Harmeson, R.H., Sollo, F.W., and Larson, T.E., "Nitrate Situation in Illinois." *Journal American Water Works Association*, *63*, 303, 1971.

14. Webb, J.R., *Muscatine Journal*, June, 1971.

15. *The Economics of Clean Water - Animal Waste Profile*, Federal Water Pollution Control Administration, Volume 11, March, 1971.

16. Dague, R.R. and Paulson, W.L., "Hydrologic Aspects of Feedlot Waste Control." *Annual Purdue Industrial Waste Conference*, *w24*, 1969.

17. Loehr, R.C., "Animal Waste - A National Problem." *Journal Sanitary Engineering Division, American Society of Civil Engineers*, *95*, April, 1969. "Agricultural Runoff- Characteristics and Control." *Journal Sanitary Engineering Division, American Society of Civil Engineers*, *98*, December, 1972.

18. Taiganides, E.P., "Disposal of Animal Waste." *Annual Purdue Industrial Waste Conference*, *19*, 1964.

19. Gilbertson, C.B., et al., "The Effect of Animal Density and Surface Slope on Characteristics of Runoff, Solid Waste and Nitrate Movement on Unpaved Beef Feedlots." University of Nebraska, Agricultural Experiment Station SB508, June, 1970.

20. Purdue University Animal Waste Committee, *Waste Handling and Disposal Guidelines for Indiana Beef Producers*. Cooperative Extension Service, Purdue University, Lafayette, Indiana.

21. Purdue University Animal Waste Committee, *Waste Handling and Disposal Guidelines for Indiana Swine Producers*. Cooperative Extension Service, Purdue University, Lafayette, Indiana.

22. Purdue University Animal Waste Committee, *Waste Handling and Disposal Guidelines for Indiana Poultrymen*. Cooperative Extension Service, Purdue University, Lafayette, Indiana.

23. Daiss, William J., "Economics of Water Pollution Abatement from Beef Cattle Feedlots." Unpublished Master of Science Thesis, University of Nebraska, May, 1972.

24. "Control of Pollution from Animal Feedlots." A hearing before a subcommittee of the Committee on Government Operations, House of Representatives, 93rd Congress, November 29-30, 1973.

25. David, M.L., Seltzer, R.E., and Eickhoff, W.D., "Economic Analysis of Proposed Effluent Guidelines - Feedlot Industry." Environmental Protection Agency, 1973.

26. Conservation Needs Inventory, Iowa Conservation Needs Committee, 1970.

27. Iowa Annual Farm Census, 1971, compiled by the Iowa Crop and Livestock Reporting Service, published by State of Iowa, Des Moines, Iowa.

28. Loehr, R.C., "Pollution Implications of Animal Wastes - A Forward Oriented Review," Environmental Protection Agency Report 13040-07, 1968, Reprinted 1973.

29. Supporting Document for Iowa Water Quality Management Plans, Iowa Department of Environmental Quality, 1976.

30. Code of Iowa, Rules of Civil Procedure. 1973. Vol. II, Sections 421.1 to 795.5.

31. Drainage Areas of Iowa Streams. United States Geological Survey, Des Moines, Iowa, 1974. Bulletin #7. 440pp.

32. Iowa Water Quality Report, Iowa Department of Environmental Quality. 1975.

33. Iowa Annual Farm Census. Department of Agriculture (Iowa), Des Moines, Iowa, 1972. Bulletin #92-AH.

34. Low Flow Characteristics of Iowa Streams Through 1966. State of Iowa. Iowa Natural Resources Council, Des Moines, Iowa, 1970. Bulletin #10.

CHAPTER VIII

NEEDS AND COMPLIANCE SCHEDULES

ASSESSMENT OF NEEDS

Municipal Needs

The waste load allocations in Table VI-1 were compared to the present discharge quantities (Table V-2) for each municipality. Facilities which could not meet their waste load allocation were evaluated as to their need for additional treatment capacity. Physical needs for effective municipal sewage control were classified into:

1. New sewer systems and treatment facilities for certain unsewered communities.
2. Upgrading to adequate secondary treatment where the present treatment level is either primary or inadequate secondary.
3. Infiltration and/or inflow (I/I) removal.
4. Advanced treatment under selective circumstances.
5. Adequate sludge disposal.

An estimation of these needs and their associated cost has been developed for the municipalities in the Iowa-Cedar River Basin. Several sources have been used to estimate costs. Some of these are listed below:

1. Grant applications, based on preliminary engineering estimates or final construction costs.
2. 1974 Needs Survey.

3. Updated EPA cost curves supplied for the 1974 needs survey.

4. State cost curves based on comparable construction costs.

All of the costs were updated to September 1974, dollars based on EPA construction indices (1).

New Systems - Of the 207 incorporated municipalities in the basin, 74 do not have a sewage collection and treatment system. These communities are presently served by individual residential septic tanks and tile drain fields. Some of these communities have a disposal problem causing either water pollution, or a health hazard, or both. This may be caused either by old systems in need of repair or replacement, or because of unsuitable site conditions such as a high groundwater table, local limestone deposits, or poor soil conditions.

Most unsewered communities have a waste water disposal problem, but whether it is cost effective to construct a sewage collection and treatment system or to replace or repair existing individual septic tank systems is difficult to estimate without a detailed engineering report.

For the purpose of this study it was assumed to be cost effective to continue using individual residential septic tank systems in those communities with projected 1990 populations of less than 200. It may also be cost-effective for certain towns with populations somewhat greater than 200 to continue the use of individual septic tank systems. However, increased potential for groundwater contamination and related health problems from the use of individual septic systems by larger communities must also be weighed in a cost-effectiveness evaluation. As a result, communities with projected 1990 populations greater than 200 were assumed to have a need for a sewage collection and treatment system while communities with projected populations of less than 200 were assumed to have no needs.

Upgrade to Secondary Treatment - With the exception of a primary plant at Burlington, all municipal treatment facilities provide what is commonly referred to as secondary treatment. The Act requires that all municipal treatment facilities shall, by July 1, 1977, have treatment equivalent to secondary treatment. Many municipal secondary plants however, cannot presently or with projected 1990 flow, meet the new EPA and DEQ definition of secondary treatment. When compared with the now quantitative definition, several municipalities are estimated to have a need toupgrade their facilities to secondary treatment.

Upgrade to Advanced Treatment - The waste load allocation analyses have pointed out several locations where treatment more stringent than secondary will be required if water quality standards are to be met. Because the new waste load allocations will be incorporated into discharge permits, several municipalities now have the need for advanced treatment facilities.

Infiltration and/or Inflow Removal - Many municipalities have infiltration and/or inflow (I/I) problems. To estimate the cost to correct I/I problems in an individual case requires detailed information concerning the systems. Without such information an accurate cost estimation is difficult. Some municipalities have been studied by consulting engineers and correction costs estimated. In addition, the 1974 Needs Survey of Municipal Wastewater Treatment Plants provides the estimated cost to study and correct I/I for a 20 percent random sampling of Iowa municipalities. For those municipalities for which an I/I correction cost estimate was available, the cost for study and correction was updated and included in the costs column of the table of needs. For those municipalities where no estimate was available for I/I correction, no costs are included because of the difficulty in making an accurate estimate without detailed information about the system. It should be realized, therefore, that the total municipal needs for the basin will be greater than what is predicted in Table VIII-4.

Most cost estimates assume that, for a given facility, it is cost effective to remove I/I rather than treat it. If it is known from engineering studies that it is cost-effective to treat I/I, those costs are included with treatment plant costs.

Sludge Disposal - Sludge disposal is a major concern at any wastewater treatment plant. A secondary municipal treatment plant produces approximately 1726 lbs. of dry solids per million gallons of water treated, or approximately 173 lbs. per 1000 people per day.

Many municipal treatment facilities in the Iowa-Cedar River Basin handle their sludge in similar manners. After settling to concentrate solids the sludge is stabilized either by aerobic or anaerobic digestion . Digested sludge is then usually either dried mechanically or on drying beds and finally hauled either to a landfill or farmland.

Farmland is the more common disposal location since many landfills cannot accept sewage sludge either wet or dry. Even though some sludges contain traces of toxic metals from plating industries, making them undesirable for application to certain crops, most grain crops are not influenced by these metals and with proper controls can serve as application sites.

If weather is conducive for equipment to get into the fields, wet digested sludge is often applied directly to farmlands. In fact, nearly all municipalities have sludge treatment equipment although many presently apply wet digested sludge directly to farmland allowing their sludge treatment equipment to lie idle. Drying beds, for example, often become relegated to a backup status as a method of sludge handling, being used in the wet spring season when farm fields become inaccessible.

Land disposal of sludge has the advantage of being one of the simplest methods during winter months. It is also generally one of the most cost-effective methods.

Costs to upgrade or to add additional sludge handling capacity that may be required under the basin plan have not been estimated for the municipalities in the basin. This is because a detailed knowledge of the existing facilities, not presently available, is needed for an accurate estimate. Also in many cases, the cost should be small when compared with that to upgrade the existing treatment. This is therefore another reason why the total municipal need for the basin will be greater than what is predicted in Table VIII-4.

Summary of Municipal Needs - Table VIII-1 is a compilation of municipal treatment facility needs for the Iowa-Cedar River Basin. In this table, municipal dischargers are listed by their numerical priority rank and information is provided on the final waste load allocation, needs for collection and treatment, and a compliance schedule to meet the waste load allocation, for each discharger. A State Operation Permit will be issued by DEQ to each municipality which will assure compliance with the basin plan.

Table VIII-2 summarizes the basin municipal treatment facility needs by type of improvement required, and the estimated costs for each.

Industrial Needs

Iowa has become increasingly more industrialized. Many industries are agriculturally oriented, such as meat packing and processing, dairy and cheese processing, fertilizer and pesticide production, wet grain milling, and

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation		Needs				Schedule of Compliance		
			Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3	Treatment	1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
1	Cedar Rapids-Main M-181	39.522	30/5	9,889/1,648	Complete advanced STP	60,000,000	Sewers	478,000[c]	---	---	11/78
2	Waterloo M-155	21.720	10/2	1,811/362	Upgrade to advanced STP, I	17,869,000	Sewers	890,000[c]	12/76	9/77	3/80
3	Williamsburg M-67	0.242	10/2	20/4	Upgrade to advanced STP	406,000[d]	None	0	e	e	e
4	Reinbeck M-152	0.300	10/2	25/5	Upgrade to advanced STP	1,076,000[d]	None	0	e	e	e
5	Vinton M-171	1.171	30/15	293/147	New secondary STP	1,991,000[a]	None	0	8/76	8/77	5/79
6	Lake Mills M-128	0.158	10/3	13/3	Upgrade to advanced STP	287,000[d]	None	0	e	e	e
7	Janesville M-100	0.039	30/15	10/5	New secondary STP	535,000[a]	Sewers	391,000[a]	---	5/76	3/78
8	Charles City M-92	1.823	30/15	456/228	Upgrade to secondary	717,000[d]	None	0	e	e	e
9	Nashua M-93	0.135	30/15	34/17	New secondary STP	359,000[d]	None	0	9/75	6/76	2/78
10	North English M-73	0.118	10/2	10/2	Upgrade to advanced STP	233,000[d]	None	0	5/77	5/78	2/80
11	Hudson M-154	0.286	30/5	71/12	Complete advanced STP	621,000[d]	None	0	---	---	2/77
12	Grundy Center M-150	0.472	10/2	39/8	Upgrade to advanced STP	896,000[d]	None	0	1/76	10/76	11/78
13	Brooklyn M-48	0.103	10/2	9/2	Upgrade to advanced STP	251,000[d]	None	0	6/76	2/77	9/78

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

			Waste Load Allocation			Needs			Schedule of Compliance		
Rank	Discharger Ref. #	1990 Flow*	Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3	Treatment	1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
14	Greene M-136	0.116	30/15	29/15	Upgrade to secondary	326,000^d	None	0	6/76	2/77	8/78
15	Jesup M-166	0.327	10/2	27/5	Upgrade to advanced STP	478,000^d	None	0	9/75	7/76	1/78
16	Steamboat Rock M-12	0.019	30/15	5/2	Upgrade to secondary	80,000^d	Sewers	99,000^c	5/76	2/77	1/79
17	Iowa Falls M-11	1.240	10/4	103/41	Upgrade to advanced STP	2,450,000^d	None	0	6/76	3/77	9/78
18	Wellsburg M-143	0.045	30/15	11/6	Upgrade to secondary	171,000^d	None	0	2/77	12/77	8/79
19	Marshalltown M-28	5.217	10/2	435/87	Upgrade to advanced STP	3,666,000	Sewers	631,000^c	6/76	5/77	12/78
20	Traer M-164	0.155	30/9	39/12	Upgrade to advanced STP	588,000^b	None	0	Under Construction		
21	Springville M-190	0.168	30/15	42/21	Upgrade to secondary	418,000^d	None	0	4/77	4/78	9/79
22	Aplington M-142	0.062	30/15	16/8	Upgrade to secondary	131,000^d	None	0	7/76	2/77	8/78
23	Shell Rock M-140	0.097	30/15	24/12	Upgrade to secondary	287,000^d	None	0	e	e	e
24	Clear Lake S.D. M-133	2.153	10/2	180/36	Upgrade to advanced STP	1,793,000^d	None	0	10/76	10/77	1/80
25	Dows M-8	0.085	10/2	7/1	Upgrade to advanced STP	179,000^d	None	0	9/76	6/77	12/78
26	Belmond M-5	0.321	15/2	40/5	Upgrade to advanced STP	454,000^d	None	0	10/76	10/77	6/79

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS
AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation		Treatment	Needs	Collection		Schedule of Compliance		
			Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3		1974 Dollars		1974 Dollars	Facility Plans	Final Plans	Completion Date
27	Tama M-37	0.355	30/15	89/44	None	0	None	0	---	---	
28	Rockwell M-102	0.097	30/15	24/12	New secondary STP	293,000^{d}	None	0	11/76	10/77	7/79
29	Burlington M-215	3.564	30/15	892/446	Upgrade to secondary	6,925,000^{b}	None	0	7/75	7/76	1/79
30	Mason City M-134	6.510	10/3	543/163	None	0	Sewers	2,115,000^{c}	---	---	
31	Osage M-88	0.340	30/15	85/43	None	0^{b}	None	0	Under Construction		
32	Victor M-49	0.078	10/2	7/1	Upgrade to advanced STP	167,000^{d}	None	0	e	e	e
33	Van Horne M-183	0.079	10/2	7/1	Complete advanced STP	418,000^{d}	None	0	9/76	8/77	8/79
34	Wellman M-79	0.169	10/2	14/3	Upgrade to advanced STP	299,000^{d}	None	0	8/76	7/77	7/79
35	Dike M-153	0.094	30/15	23/12	Upgrade to secondary	178,000^{a}	None	0	e	e	e
36	Conrad M-160	0.058	10/5	5/2	Upgrade to advanced STP	143,000^{d}	None	0	11/76	10/77	2/79
37	Shellsburg M-175	0.095	30/15	24/12	Upgrade to secondary	281,000^{d}	None	0	4/77	2/78	9/79
38	Hampton M-110	0.425	30/5	107/18	Upgrade to advanced STP	621,000^{d}	None	0	11/76	9/77	8/79
39	Palo M-178	0.073	30/15	18/9	Upgrade to secondary	239,000^{d}	None	0	3/76	11/76	12/77

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation Concentration BOD$_5$/NH$_3$	 lbs. Eff. BOD$_5$/NH$_3$	Treatment	Needs 1974 Dollars	 Collection	 1974 Dollars	Schedule of Compliance Facility Plans	 Final Plans	 Completion Date
40	Ackley M-141	0.212	30/5	53/9	Upgrade to advanced STP	335,000[d]	None	0	8/76	6/77	3/79
41	LaPorte City M-165	0.271	30/9	68/20	Upgrade to advanced STP	406,000[d]	None	0	2/76	11/76	8/78
42	Forest City - Main M-126	0.700	10/2	58/12	Upgrade to advanced STP	837,000[d]	None	0	8/75	5/76	5/78
43	Waverly M-98	0.665	30/15	167/83	New secondary STP	1,912,000[a]	None	0	5/76	4/77	5/79
44	Riverside M-81	0.103	10/2	9/2	Upgrade to advanced STP	215,000[d]	None	0	11/75	8/76	3/78
45	Orchard M-89	0.011	30/15	3/1	New secondary STP	65,000[d]	None	0	e	e	e
46	Clarksville M-139	0.176	30/15	44/22	None	0	None	0	Under Construction		
47	Cedar Falls - Cedar Hts. M-148	0.050	30/15	13/6	None	0	None	0	1/77	1/78	1/79
48	Cedar Rapids - Ind. Cr. M-189		See Cedar Rapids - Main							11/75	11/78
49	Cedar Falls - Main M-147	5.365	30/15	1,342/671	Disinfection	106,000[d]	None	0	1/77	1/78	1/79
50	Evansdale M-156	0.562	30/15	141/70	None	0	None	0	e	e	e
51	Center Point M-174	0.248	30/15	62/31	Upgrade to secondary	423,000[a]	None	0	9/76	3/77	12/78
52	Elk Run Hts. M-157	0.150	30/15	37/19	None	0	None	0			

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation		Treatment	Needs	Collection		Schedule of Compliance		
			Concentration BOD$_5$/NH$_3$	lbs. Eff. BOD$_5$/NH$_3$		1974 Dollars		1974 Dollars	Facility Plans	Final Plans	Completion Date
53	Urbana M-172		Controlled Discharge		Third lagoon cell	90,000^{d}	None	0	e	e	e
54	Walker M-173		Controlled Discharge		Third lagoon cell	103,000^{d}	None	0	e	e	e
55	Alburnett M-187		Controlled Discharge		Third lagoon cell	90,000^{d}	None	0	e	e	e
56	Atkins M-177	0.075	30/15	19/9	Upgrade to secondary	239,000^{d}	None	0	e	e	e
57	Newhall M-176		Controlled Discharge		Third lagoon cell	99,000^{d}	None	0	e	e	e
58	Garrison M-170		Controlled Discharge		Third lagoon cell	81,000^{d}	None	0	e	e	e
59	Brandon M-167	0.054	30/15	13/7	New secondary STP	197,000^{d}	None	0	e	e	e
60	Mt. Auburn M-168		Controlled Discharge		Two lagoon cells	73,000^{d}	None	0	e	e	e
61	Robins M-179		NEMTF		New secondary STP	274,000^{a}	Complete sewer sys.	547,000^{a}	e	e	e
62	Gilbertville M-159	0.200	30/15	50/25	None	0	None	0	Just Completed		
63	Raymond M-158		NEMTF		New secondary STP	298,000^{b}	Complete sewer sys.	381,000^{a}	e	e	e
64	Martelle M-191		NEMTF		Three cell lagoon	109,000^{b}	Complete sewer sys.	405,000^{d}	e	e	e
65	Bertram M-192		NEMTF		Three cell lagoon	85,000^{d}	Complete sewer sys.	137,000^{c}	e	e	e
66	Marengo M-51		Controlled Discharge		Third lagoon cell	172,000^{d}	None	0	e	e	e

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation		Treatment	Needs			Schedule of Compliance		
			Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3		1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
67	Belle Plaine M-43	0.174	30/15	43/22	New secondary STP	578,000[b]	None	0		2/76	9/77
68	Toledo M-36	0.300	30/15	75/38	Upgrade to secondary	179,000[d]	None	0	e	e	e
69	State Center M-29	0.207	30/15	52/26	Upgrade to secondary	522,000[b]	None	0	e	e	e
70	Amana S.D. M-54		Controlled Discharge		None	0	None	0	---	---	---
71	Dysart M-40	0.226	30/15	57/28	Upgrade to secondary	143,000[d]	Sewers	124,000[c]	11/76	10/77	11/78
72	Solon M-59	0.134	30/15	33/17	Upgrade to secondary	288,000[b]	None	0		2/76	11/77
73	LeGrand M-33		Controlled Discharge		Third lagoon cell	111,000[d]	None	0	e	e	e
74	Swisher M-56	0.065	30/15	16/8	None	0	None	0			
75	Gilman M-31		Controlled Discharge		Third lagoon cell	93,000[d]	None	0	e	e	e
76	Garwin M-35	0.066	30/15	17/8	New secondary STP	124,000[b]	None	0	Under Construction		
77	Ely M-57		Controlled Discharge		Two lagoon cells	80,000[d]	None	0	11/76	9/77	3/79
78	Clutier M-39		Controlled Discharge		Third lagoon cell	75,000[d]	None	0	e	e	e
79	Homestead S.D. M-53		Controlled Discharge		Third lagoon cell	75,000[d]	None	0	e	e	e
80	Montour M-34		Controlled Discharge		Third lagoon cell	77,000[d]	None	0	e	e	e

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS
AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	Waste Load Allocation 1990 Flow*	Waste Load Allocation Concentration BOD5/NH3	Waste Load Allocation lbs. Eff. BOD5/NH3	Treatment	Needs 1974 Dollars	Collection	1974 Dollars	Schedule of Compliance Facility Plans	Schedule of Compliance Final Plans	Schedule of Compliance Completion Date
81	Chelsea M-38	NEMTF			Three cell lagoon	92,000[b]	Complete sewer sys.	405,000[a]	e	e	e
82	Walford M-55	NEMTF			Three cell lagoon	103,000[a]	Complete sewer sys.	117,000[a]	e	e	e
83	Elberon M-41	NEMTF			Three cell lagoon	136,000[b]	Complete sewer sys.	275,000[d]	e	e	e
84	Ferguson M-32	NEMTF			Three cell lagoon	87,000[d]	Complete sewer sys.	340,000[d]	e	e	e
85	Middle Amana S.D. M-52	NEMTF			Three cell lagoon	N.A.	Complete sewer sys.	N.A.	e	e	e
86	Shueyville M-58	NEMTF			Three cell lagoon	84,000[d]	Complete sewer sys.	315,000[d]	e	e	e
87	Haverhill M-30	NEMTF			Three cell lagoon	81,000[d]	Complete sewer sys.	290,000[d]	e	e	e
88	Garner M-2	Controlled Discharge			Upgrade system	251,000[d]	I/I	5,000[d]	1/77	1/78	12/78
89	Eldora-Reform. M-14	0.600	30/8	150/40	Upgrade to advanced STP	717,000[d]	None	0	1/76	7/76	1/78
90	Eldora-Main M-13										
91	Hubbard M-22	Controlled Discharge			Third lagoon cell	98,000[d]	None	0	e	e	e
92	Alden M-10	Controlled Discharge			Third lagoon cell	100,000[d]	None	0	10/76	7/77	12/78
93	Williams M-15	Controlled Discharge			Third lagoon cell	82,000[d]	None	0	e	e	e
94	Zearing M-24	Controlled Discharge			Third lagoon cell	87,000[d]	None	0	e	e	e

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS
AND SCHEDULE OF COMPLIANCE**

			Waste Load Allocation			Needs			Schedule of Compliance		
Rank	Discharger Ref. #	1990 Flow*	Concentration BOD$_5$/NH$_3$	lbs. Eff. BOD$_5$/NH$_3$	Treatment	1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
95	Union M-18		Controlled Discharge		Third lagoon cell	83,000[d]	None	0	e	e	e
96	Klemme M-3		Controlled Discharge		Third lagoon cell	89,000[d]	None	0	e	e	e
97	Albion M-27		Controlled Discharge		Third lagoon cell	108,000[d]	None	0	e	e	e
98	Clemons M-26		Controlled Discharge		Third lagoon cell	73,000[d]	None	0	e	e	e
99	Raddcliffe M-21		Controlled Discharge		Third lagoon cell	85,000[d]	None	0	e	e	e
100	Liscomb M-20		Controlled Discharge		Third lagoon cell	82,000[d]	None	0	e	e	e
101	Crystal Lake M-1		NEMTF		New secondary STP	147,000[b]	Complete sewer sys.	209,000[a]	e	e	e
102	Rowan M-6		NEMTF		Three cell lagoon	81,000[d]	Complete sewer sys.	290,000[d]	e	e	e
103	Goodell M-4		NEMTF		Three cell lagoon	83,000[d]	Complete sewer sys.	305,000[d]	e	e	e
104	New Providence M-23		NEMTF		Three cell lagoon	80,000[d]	Complete sewer sys.	143,000[a]	e	e	e
105	St. Anthony M-25		NEMTF		Three cell lagoon	80,000[d]	Complete sewer sys.	285,000[d]	e	e	e
106	Iowa City-Main M-65	10.577	18/7	1,588/618	Upgrade to advanced STP	5,497,000[d]	Sewers	179,000[c]	9/76	7/77	7/79
107	Coralville M-64	2.650	30/15	663/332	Upgrade to secondary	2,330,000[d]	None	0	e	e	e
108	North Liberty M-61	0.235	30/15	59/29	Upgrade to secondary	771,000[a]	None	0	10/75	9/76	3/78

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS
AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3	Treatment	Needs 1974 Dollars	Collection	1974 Dollars	Schedule of Compliance Facility Plans	Final Plans	Completion Date
109	Columbus Jct. M-84		Controlled Discharge		Third lagoon cell	143,000[d]	None	0	e	e	e
110	Lone Tree - S M-69		Controlled Discharge		None	0	None	0	---	---	---
111	Hills M-66	0.090	30/15	23/11	Upgrade to secondary	275,000[d]	None	0	e	e	e
112	Oxford M-62	0.116	30/15	29/15	Upgrade to secondary	323,000[d]	None	0	e	e	e
113	Conesville M-82		Controlled Discharge		None	0	None	0	---	---	---
114	Tiffin M-63	0.052	30/15	13/7	Upgrade to secondary	102,000[a]	None	0	e	e	e
115	Lone Tree - N M-68		Controlled Discharge		None	0	None	0	---	---	---
116	Iowa City - Westing. M-60		Controlled Discharge		None	0	None	0	---	---	---
117	W. Burlington M-216	0.537	30/15	135/67	New secondary STP	4,941,000[b]	Sewers	103,000[c]	---	7/76	7/78
118	Mediapolis M-214		Controlled Discharge		Third lagoon cell	121,000[d]	None	0	e	e	e
119	St. Ansgar M-86		Controlled Discharge		Third lagoon cell	105,000[d]	None	0	5/76	3/77	12/77
120	Denver M-99		Controlled Discharge		Third lagoon cell	147,000[d]	None	0	e	e	e
121	Floyd M-91		Controlled Discharge		Third lagoon cell	82,000[d]	None	0	e	e	e
122	Stacyville M-94	0.027	30/15	7/4	None	0	None	0	3/76	12/76	2/78
123	Plainfield M-97		Controlled Discharge		None	0	None	0	---	---	---

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

			Waste Load Allocation			Needs			Schedule of Compliance		
Rank	Discharger Ref. #	1990 Flow*	Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3	Treatment	1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
124	Grafton M-90		NEMTF		Three cell lagoon	87,000[d]	Complete sewer sys.	345,000[d]	Under Construction		
125	Mitchell M-87		NEMTF		Three cell lagoon	82,000[d]	Complete sewer sys.	300,000[d]	e	e	e
126	Forest City - Lagoon M-127		See Forest City - Main						8/75	5/76	5/78
127	Leland M-125		Controlled Discharge		Two lagoon cells	72,000[d]	None	0	3/77	11/77	6/79
128	Thompson M-124		NEMTF		Three cell lagoon	112,000[d]	Complete sewer sys.	555,000[d]	e	e	e
129	Fertile M-129		NEMTF		New secondary STP	253,000[b]	Complete sewer sys.	395,000[a]	e	e	e
130	Joice M-130		NEMTF		Three cell lagoon	99,000[a]	Complete sewer sys.	203,000[a]	e	e	e
131	Hanlontown M-131		NEMTF		Three cell lagoon	85,000[d]	Complete sewer sys.	320,000[d]	e	e	e
132	Dumont M-106		Controlled Discharge		Third lagoon cell	97,000[d]	Sewers	42,000[a]	e	e	e
133	Sheffield M-105		Controlled Discharge		Third lagoon cell	117,000[d]	None	0	e	e	e
134	Allison M-115		Controlled Discharge		Third lagoon cell	130,000[d]	None	0	e	e	e
135	Thornton M-103		Controlled Discharge		Third lagoon cell	81,000[d]	None	0	e	e	e
136	Latimer M-108		NEMTF		Three cell lagoon	95,000[d]	Complete sewer sys.	314,000[a]	e	e	e
137	Meservey M-104		NEMTF		Three cell lagoon	93,000[b]	Complete sewer sys.	247,000[a]	e	e	e
138	Coulter M-113		NEMTF		Three cell lagoon	85,000[d]	Complete sewer sys.	315,000[d]	e	e	e

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

			Waste Load Allocation			Needs			Schedule of Compliance		
Rank	Discharger Ref. #	1990 Flow*	Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3	Treatment	1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
139	Alexander M-107		NEMTF		Three cell lagoon	83,000[d]	Complete sewer sys.	305,000[d]	e	e	e
140	Bristow M-112		NEMTF		Three cell lagoon	85,000[d]	Complete sewer sys.	269,000[c]	e	e	e
141	Swaledale M-101		NEMTF		New secondary STP	161,000[a]	Complete sewer sys.	162,000[a]	e	e	e
142	Geneva M-114		NEMTF		Three cell lagoon	79,000[d]	Complete sewer sys.	301,000[c]	e	e	e
143	Gladbrook M-162		Controlled Discharge		Third lagoon cell	105,000[d]	None	0	e	e	e
144	Beaman M-161		Controlled Discharge		Three cell lagoon	0	None	0	Under Construction		
145	Kalona M-80		Controlled Discharge		None	0	None	0	---	---	---
146	Deep River M-71		NEMTF		Three cell lagoon	90,000[d]	Complete sewer sys.	365,000[d]	e	e	e
147	Keswick M-76		NEMTF		Three cell lagoon	85,000[d]	Complete sewer sys.	320,000[d]	e	e	e
148	S. English M-77		NEMTF		Three cell lagoon	82,000[d]	Complete sewer sys.	295,000[d]	e	e	e
149	Millersburg M-72		NEMTF		Three cell lagoon	80,000[d]	Complete sewer sys.	148,000[c]	e	e	e
150	Parkersburg M-144		Controlled Discharge		None	0	None	0	---	---	---
151	New Hartford M-146		Controlled Discharge		Third lagoon cell	96,000[d]	None	0	e	e	e
152	Stout M-145		NEMTF		Three cell lagoon	81,000[d]	Complete sewer sys.	290,000[d]	e	e	e

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

			Waste Load Allocation			Needs			Schedule of Compliance		
Rank	Discharger Ref. #	1990 Flow*	Concentration BOD$_5$/NH$_3$	lbs. Eff. BOD$_5$/NH$_3$	Treatment	1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
153	Holland M-149	Controlled Discharge			None	0	None	0	---	---	---
154	Northwood M-116	0.31	30/15	77/39	New secondary STP	560,000^d	None	0	2/76	12/76	5/78
155	Mt. Vernon M-194	0.609	30/15	1[illegible]3/76	Upgrade to secondary	335,000^d	None	0	12/75	11/76	6/78
156	West Liberty M-202	0.375	30/15	94/47	New secondary STP	2,866,000^b	None	0	---	---	1/77
157	Tipton M-196	0.417	30/15	104/52	None	0	None	0			
158	Wilton M-201	0.410	30/15	103/51	Upgrade to secondary	239,000^d	None	0	4/76	1/77	9/78
159	Durant M-200	0.247	30/15	62/31	None	0	None	0	---	---	---
160	Walcott M-198	Controlled Discharge			None	0	None	0	---	---	---
161	West Branch M-203	0.209	30/15	52/26	New secondary STP	563,000^a	None	0	7/77	4/78	12/79
162	Lisbon M-193	0.229	30/15	57/29	Upgrade to secondary	149,000^d	None	0	e	e	e
163	Nichols M-205	Controlled Discharge			Third lagoon cell	86,000^d	None	0	e	e	e
164	Stanwood M-195	0.085	30/15	21/11	Upgrade to secondary	265,000^d	None	0	e	e	e
165	Bennett M-197	Controlled Discharge			Third lagoon cell	80,000^d	None	0	1/77	1/78	1/79
166	Stockton M-199	Controlled Discharge			Third lagoon cell	76,000^d	None	0	e	e	e
167	Atalissa M-204	NEMTF			Three cell lagoon	91,000^d	Complete sewer sys.	375,000^d	e	e	e

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation Concentration BOD_5/NH_3	Waste Load Allocation lbs. Eff. BOD_5/NH_3	Needs Treatment	Needs 1974 Dollars	Needs Collection	Needs 1974 Dollars	Schedule of Compliance Facility Plans	Schedule of Compliance Final Plans	Schedule of Compliance Completion Date
168	Manly M-118		Controlled Discharge		Third lagoon cell	129,000[d]	Sewers	179,000[c]	5/77	5/78	9/79
169	Nora Springs M-121	0.209	30/15	52/26	Upgrade to secondary	137,000[d]	None	0	4/77	4/78	12/79
170	Rockford M-122		Controlled Discharge		Third lagoon cell	109,000[d]	None	0	e	e	e
171	Rudd M-138		Controlled Discharge		Three cell lagoon	0	None	0	Under Construction		
172	Kensett M-117		NEMTF		Three cell lagoon	97,000[d]	Complete sewer sys.	425,000[d]	e	e	e
173	Wapello M-211		Controlled Discharge		Third lagoon cell	163,000[d]	None	0	e	e	e
174	Morning Sun M-212		Controlled Discharge		Third lagoon cell	109,000[d]	None	0	e	e	e
175	Ainsworth M-207		NEMTF		Three cell lagoon	100,000[d]	Complete sewer sys.	450,000[d]	e	e	e
176	Letts M-209		NEMTF		Three cell lagoon	361,000[b]	Complete sewer sys.	419,000[b]	e	e	e
177	Oakville M-213		NEMTF		Three cell lagoon	100,000[d]	Complete sewer sys.	448,000[c]	e	e	e
178	Grandview M-210		NEMTF		Three cell lagoon	101,000[d]	Complete sewer sys.	398,000[c]	e	e	e
179	Columbus City M-208		NEMTF		Three cell lagoon	95,000[d]	Complete sewer sys.	405,000[d]	e	e	e
180	Fredonia M-206		NEMTF		Three cell lagoon	80,000[d]	Complete sewer sys.	209,000[c]	e	e	e
181	Marble Rock M-135		Controlled Discharge		Third lagoon cell	86,000[d]	None	0	e	e	e
182	Fairfax M-186		Controlled Discharge		Two lagoon cells	104,000[d]	None	0	11/76	8/77	11/78

TABLE VIII-1
MUNICIPAL ASSESSMENT OF NEEDS AND SCHEDULE OF COMPLIANCE**

Rank	Discharger Ref. #	1990 Flow*	Waste Load Allocation		Treatment	Needs			Schedule of Compliance		
			Concentration BOD_5/NH_3	lbs. Eff. BOD_5/NH_3		1974 Dollars	Collection	1974 Dollars	Facility Plans	Final Plans	Completion Date
183	Keystone M-182		Controlled Discharge		Third lagoon cell	90,000[d]	None	0	e	e	e
184	Blairstown M-184		Controlled Discharge		Third lagoon cell	93,000[d]	None	0	10/76	10/77	12/78
185	Norway M-185		Controlled Discharge		Third lagoon cell	90,000[d]	None	0	e	e	e
186	Ladora M-50		Controlled Discharge		Third lagoon cell	77,000[d]	None	0	e	e	e
187	Malcolm M-47		Controlled Discharge		Third lagoon cell	80.000[d]	None	0	e	e	e

*MGD, million gallons per day

a - Updated costs from FY76 Construction Grant Priority List.

b - Updated costs from FY75 Construction Grant Priority List.

c - Updated costs from 1974 DEQ Survey of Needs.

d - Updated costs from EPA and DEQ Cost Curves.

e - At Such Time as Deemed Necessary.

f - Under Construction.

TABLE VIII-2

SUMMARY OF MUNICIPAL NEEDS

Treatment Type Need	No. of Municipalities	1974 Dollars
Complete Advanced STP	3	$ 61,039,000
Upgrade to Advanced STP	24	39,863,000
New Mechanical Secondary STP	18	16,117,000
Upgrade to Secondary STP	29	16,828,000
Three Cell Lagoon	37	3,602,000
Add Two Lagoon Cells	4	329,000
Add Third Lagoon Cell	46	4,445,000
No Need	21	
Maintain Septic Tanks	22	
TOTAL	204	$142,223,000

rendering. All of these are "wet" industries (using large quantities of water) and produce inordinately large amounts of waste which may, depending upon the facility, be difficult to treat by conventional methods. In the Iowa-Cedar River Basin many of the industries discharge to municipal treatment facilities, and occasionally create an overload condition at the municipal plant. Most of the remaining industries have their own treatment facilities. However, the waste load is still so great that some must maintain controlled discharges of their effluent.

The majority of industry in the basin is "dry" (using little or no process water) such as tractor and implement manufacturing, metal fabrication (for furnaces and appliances), printing, and electrical component assembly.

DEQ, through the State Operation Permit Program, in coordination with the Federal NPDES Discharge Permit Program will regulate industrial dischargers. Effluent limits are set according to the waste load allocations. BPT is the minimum allowable allocation.

Table VIII-3 lists the significant industrial dischargers in the basin, their present discharge, waste load allocation, projected need, and a compliance schedule. A permit will be issued by DEQ to the industry, which will assure compliance with the basin plan.

TABLE VIII-3

TREATMENT NEEDS AND SCHEDULE OF COMPLIANCE FOR SIGNIFICANT INDUSTRIES

Industrial Discharger	Flow MGD	Present Eff.lb.-BOD_5/NH_3	7-1-77 Eff.lb.-BOD_5/NH_3	Treatment Needs	Schedule of Compliance		
					Preliminary Report	Final Plans	Completion Date
Farmer's Co-op Creamery (Nashua) I-45	0.015	170/NA	0/0	To Nashua STP	---	---	4/1/76
Armour & Co. (Mason City) I-65	0.640	480/NA	0/0	Plant to be closed	---	---	8/14/75
Pepsi Cola Bottling Co. (Waterloo) I-82	0.013	13/NA	0/0	To Waterloo STP	---	---	---
Reinbeck Canning Co. I-85	0.160			Irrigation System	submitted	---	8/1/76
Penick & Ford (Cedar Rapids) I-118	2.180	273/NA	0/0	To Cedar Rapids STP	---	---	12/15/75
Cargill-16th St. (Cedar Rapids) I-120	2.540	530/NA	0/0	To Cedar Rapids STP	---	1/1/76	10/1/76
Central Soya (Belmond) I-5	0.216	40/NA	18/NA	Upgrade Existing Facility	---	---	---

TABLE VIII-3 (CONTINUED)

TREATMENT NEEDS AND SCHEDULE OF COMPLIANCE FOR SIGNIFICANT INDUSTRIES

Industrial Discharger	Flow MGD	Present Eff.lb.- BOD_5/NH_3	7-1-77 Eff.lb.- BOD_5/NH_3	Treatment Needs	Schedule of Compliance		
					Preliminary Report	Final Plans	Completion Date
Farmland Foods (Iowa Falls) I-12	0.450	110/340	Controlled Discharge	Upgrade Existing Facility	11/1/75	2/1/76	12/31/76
Packing Corp. of America (Tama) I-24	0.55	42/4	91/18	Upgrade Existing Facility	---	---	6/30/77
Tama Meat Packing Corp. (Tama) I-25	0.770	450/128	Controlled Discharge	---	8/1/75	2/1/76	6/30/77
Twin County Dairy (Kalona) I-40	0.015	13/0.4	4/2	Upgrade Existing Facility	---	---	7/31/76
Rath Packing Co. (Col. Jct.) I-42	0.525	197/330	109/--	Upgrade Existing Facility	---	10/1/75	6/30/77
John Deere & Co. (Waterloo) I-81&88	37.480	No Net Addition	No Net Addition	None	---	1/1/76	1/1/77

According to the schedules of compliance for the significant industrial dischargers, a reduction of industrial waste loads and upgrading of existing facilities is estimated to cost the industries approximately 0.210 million dollars. This cost estimation was derived from a DEQ survey of the significant industries.

Semipublic Needs

The major semipublic wastewater disposal problem is created by water treatment plants. Many of these plants use lime (calcium hydroxide) to soften the water before distribution. The sludge created poses a significant disposal problem.

Some facilities lagoon the sludge, but this does not answer the final disposal problem of what to do when the lagoons are full. Other plants discharge their lime sludge directly to the river. These plants are currently studying methods to eliminate such discharges.

Lime sludge does have an economic value if handling problems can be overcome. The sludge can be used for landfill, or as a pH buffer on farmland which has acidic soil. Recently concrete manufacturers have expressed an interest in the material, since it is one of the major ingredients in their product.

As pressure is brought to bear on water treatment plants from government agencies and landowners located adjacent to sludge lagoons, lime sludge disposal will receive greater attention.

An estimate of semipublic needs and related costs to meet the basin plan requirements has not been performed due to a lack of information on existing facilities.

Nonpoint Source Needs

Nonpoint sources of pollution have been divided into the three main areas of: general rural runoff, animal feeding operations, and urban nonpoint sources. Each of the three areas has been discussed in Chapter VII, and in greater detail in the Supporting Document for Iowa Water Quality Management Plans (3).

General Rural Runoff - The major pollution parameters in general rural runoff have been classified as sediment, nutrients, and organics. Sediment is usually the parameter of most significance.

Nutrients can also be of major significance especially if they will affect near-by lakes or impoundments. Runoff from cropland is a major source of nutrients. Nutrient pollution abatement is accomplished through improved methods of fertilizer application and implementation of the same measures used to control soil loss.

Except where runoff occurs from animal feeding operations, organics are usually of relatively minor importance, especially when compared with the contribution from municipalities.

Physical needs for abating general rural runoff pollution reduce to those methods employed for controlling soil loss. These methods have been discussed in some detail in Reference (3). An estimate to implement such control measures in the basin was presented in Chapter VII of this plan. The estimated capital investments amounted to approximately 269 million dollars.

Animal Feeding Operations - The major pollutants from animal feeding operations are suspended solids, nutrients, and organics. Physical needs to control these sources of pollution have been summarized as including storage basins and runoff controls, with land application for final disposal. These methods have been discussed in some detail in Reference (3). An estimate of the cost to implement such control measures in the Iowa-Cedar River Basin was presented in Chapter VII of this plan. The estimated capital investments amounted to approximately 13.6 million dollars.

Urban Nonpoint Sources - An estimate of the costs involved in the collection, containment, and/or treatment of urban runoff was presented in Chapter VII. A discussion of urban runoff and treatment methods may be found in Reference (3). The capital cost of collection and treatment facilities has been estimated at approximately 586 million dollars.

Summary of Needs

The total dollar need to meet the objectives of this basin plan for the Iowa-Cedar River Basin is estimated to exceed $1.031 billion. This amount is broken down in Table VIII-4.

TABLE VIII-4

SUMMARY OF NEEDS

Need	Approximate Dollars
Municipal Treatment	$ 142,223,000
Municipal Collection	18,258,000
Industrial Treatment (Significant Industries)	210,000
Animal Feeding Operation Controls	13,565,000
Soil Loss Controls	269,121,000
Urban Stormwater Runoff Collection and Treatment	586,490,000
TOTAL	$1,029,867,000

REFERENCES

1. Sewage Treatment Plant and Sewer Construction Costs Index, U. S. EPA Office of Water Program Operations, Municipal Construction Division.

2. Manson, R. J. and Merrit, C.A., "Land Application of Liquid Municipal Wastewater Sludges," Water Pollution Control Federation Journal, Vol. 47, No. 1, January 1975.

3. Supporting Document for Iowa Water Quality Management Plans, Iowa Department of Environmental Quality, 1976.

CHAPTER IX

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Several significant points and conclusions have arisen as a result of the development of this basin plan. Some of these include:

1. The Iowa-Cedar River Basin currently has 207 incorporated municipalities with a total population of 581,739. The population of these municipalities is projected to increase by 19 percent to 693,323 by 1990.
2. Of the 207 incorporated municipalities, 133 currently have collection and treatment facilities and 74 communities have no central sewerage system. Many of the treatment facilities are not presently achieving secondary treatment.
3. The waste stabilization lagoon serves nearly 45 percent of the municipalities and a large number of industries within the basin.
4. A number of water pollution instances attributable to point source discharges have been documented in the basin. Most of these instances have occurred at stream flows well above the 7 day 1- in-10 year low flow.
5. Water Quality violations have been documented during high stream flows. These pollution problems can probably be attributed to agricultural and urban runoff.

6. Sediment, which often carries other pollutants with it, is a significant pollution parameter in Iowa. Proper land and water management can minimize soil erosion. Effort should be made to continue and increase the use of established soil conservation practices. A few of these practices involve only alternate land management with greater benefit resulting from the same monetary outlay. This can also be true for certain pollutants carried with sediment. Pesticides in the environment can be reduced by using soil conservation practices and fertilizer loss can be minimized by application methods which assure efficient uptake by crops.
7. All lakes and reservoirs in the basin are subject to potential eutrophication from rural and urban runoff.
8. Land disposal of digested municipal sewage sludge is the most economical ultimate disposal method currently being used in the planning area. Many communities allow existing sludge drying equipment to remain idle much of the time, preferring to wet haul sludge to farmland when conditions allow equipment onto the fields.
9. Waste load allocations have shown that a significant number of dischargers will be required to provide advanced waste treatment to meet water quality standards at the 7-day, 1-in-10 year low stream flow.
10. The water quality strategy for point sources, as outlined in the plan, should result in maintaining acceptable surface water quality for designated uses.

11. The basin plan has demonstrated (Chapter VII) a need in the Iowa-Cedar River Basin for municipal treatment and collection facilities which may exceed a cost of $161 million.

12. Most industries should be able to meet the July 1, 1977 requirements of the Act. A high percentage of municipalities will also meet this deadline, however, long construction schedules and lack of adequate grant funding will result in some municipalities not meeting the deadline. The 1983 goal which requires all streams to be of suitable water quality to be fishable and swimmable can be met if Federal and State funding is continued.

RECOMMENDATIONS

As stated in Chapter I, the objective of this water quality management plan is to provide the framework for achieving the protection and enhancement of water resources in the Iowa-Cedar River Basin. The implementation of this plan will help in attaining that objective. However, several possibilities exist that would further aid this effort. It is therefore recommended that the following topics be given further consideration and study.

1. The State Water Plan, which is currently under development, should give careful consideration to water quality. Consideration should also be given to restricting future water uses in water quality limited segments.
2. Non-structural management measures that can enhance and protect water quality should be given careful consideration by all levels of government, business interests, and private citizens.

   Such measures include:

   a. Improved operation should be initiated at all wastewater treatment facilities. Small communities may be able to accomplish this goal by sharing qualified operators and laboratory facilities.

   b. Land use planning and zoning decisions should include considerations of water quality. This is particularly important when development around lakes may occur.

c. Local government should give consideration to the impact on water quality before making commitments for new development or industry.

d. Tillage practices should be selected that will minimize soil erosion.

e. Woodland management practices should be selected that will minimize soil erosion.

f. Agricultural chemicals should be applied at rates and times that will minimize runoff of fertilizers and herbicides.

g. The design of any new or expanded industrial or commercial facilities should give careful consideration to minimizing the amount of waste products that will be discharged from that facility.

h. Recycling should be encouraged and selected even when marginally cost-effective on the assumption that the cost of all natural resources will increase in the future.

i. Strict enforcement of local ordinances should be practiced. Such ordinances should include provision for rigid inspection of all new sewer construction and connections.

j. County Boards of Health should adopt and enforce individual waste disposal system regulations promulgated by the State Health Department.

k. Sanitary districts should be established to provide sewerage services to unincorporated areas.

l. Although thermal discharges are not considered to be a major problem in the study area, they are significant enough that further studies are warranted to determine specific thermal limits.

m. Land disposal of wastewater should be considered where soil and other conditions permit, and complete retention lagoons rather than small mechanical treatment plants should be considered where applicable, in view of the national goal of zero discharge of pollutants by 1985. The communities, assisted by the Department of Environmental Quality, are responsible for considering this in their plan alternatives.

n. It is known that urban runoff contains metals and other pollutants, but their impact on downstream water uses needs further study. Urban runoff can be controlled by storage and treatment. Economic feasibility studies should be performed for all major municipalities.

o. Land disposal of digested municipal sewage sludge is the most economical ultimate disposal method presently used. Many communities let sludge drying equipment lie idle much of the time, preferring to wet haul sludge when farmland is conducive to allow equipment into the fields. Departmental policy should address this disposal problem. A program could be mounted to educate the farmer on the economic advantages of accepting this material.

p. Establishment of specific waste load allocations has indicated certain areas where regionalization of facilities should be considered. In addition to combining industrial discharges with publicly-owned facilities, combinations of municipal facilities are possible.

(1) Facility Planning - It is recommended that detailed evaluations be performed as an element of the Section 201, Step 1 Facilities Planning for regionalization of waste treatment facilities in the following areas:

Belmond
Iowa Falls
Eldora
Marshalltown
Tama-Toledo
Iowa City
Charles City
Nashua
Forest City
Mason City
Ackley
Waterloo-Cedar Falls
Cedar Rapids

(2). Other - At the community and county level, zoning and land use planning should be used to assure an orderly and efficient development of unsewered areas.

3. Structural measures will, of course, also help to protect water quality. Many of the structural measures required in the basin are outlined in the needs table.

CHAPTER X - REVIEW AND REVISION

PUBLIC HEARING PROCEDURE

Public hearings are specified by the Federal Water Pollution Control Act Amendments of 1972 as part of the procedure for establishing a water quality management plan for river basins. In accordance with Section 101(e) of the Act, public participation was required on significant elements of the planning process.

Statements or presentations given at public hearings were required to be retained in writing for the record. Verbal comments and written statements were specified to be limited to the Water Quality Management Plan. Written statements were requested to be submitted to DEQ at least one week prior to the hearing. Additional statements, filed within ten days after the scheduled hearing, were also considered part of the record.

"Reasonable Notice" was given to the public by prominent advertisement, indicating time, date, place, and availability of proposed plan, 30 days prior to the date of each hearing. Complete records of such hearings are kept and a transcript made available on payment of fee.

WATER QUALITY STANDARDS REVIEW

The Federal Act specifies that at least every three years, starting from date of enactment of the 1972 Amendments, the Iowa Water Quality Commission hold public hearings for purpose of review, and/or revision, of the Iowa Water Quality Standards. The 303(e) process, including this basin plan developed as part of the process, is used to assist in making any necessary revisions of Iowa Water Quality Standards. The Iowa Water Quality Standards are scheduled for revision in 1976.

BASIN PLAN REVISION

This Basin Plan is Phase I of the annual continuing planning process as required by section 303(3) of the Act. This basin plan will be revised under Phase II in such manner as is necessary to maintain its viability. Thereafter, this Basin Plan will be reviewed annually and revision will be made if warranted. Revision to the wasteload allocations, compliance schedules, or construction grant needs and priorities will be based on the most current and accurate data available.

BASIN PLAN HEARINGS

Public hearings concerning the adoption of the proposed Iowa-Cedar River Basin Water Quality Management Plan were conducted by the Department of Environmental Quality. The hearings were held December 3, 1975, at 7:30 p.m. in Room A107, Building A, North Iowa Community College, 500 College Drive, Mason City, Iowa; December 4, 1975, at 7:30 p.m. in Lecture Room 1, Physics Building, University of Iowa, Iowa City, Iowa. A copy of the public notice announcing the hearings appears in this chapter.

Identified in the following list are persons who attended the hearings:

At Mason City

Name	Representing
Merlin Halty	City of Charles City
Ervin J. Meyer	Self
Lawrence E. Meyer	Self
Larry W. Lowick	SCDC
John M. Crosman	Libbey Owens Ford Co.
Vinod K. Sareen	INRCOG
Sam Claassen	Engineering & Surveying
Merrill G. Smith	City of Charles City
F. R. Pfeiffer	DEQ
E. L. Willson	City of Charles City
Don Heeren	Self
Fred Salsbury	Public Works, Waverly
Roger H. Kottke	Salsbury Labs
Philip J. Dvorak	Cerro Gordo Co.
Russell C. Smith	Salsbury Labs
George W. Hausman	City of Grundy Center
Troy Anderson	Grundy Register
Evan Nolte	Mason City Area Chamber
Bruce R. Wilde	KLSS-KSMN News
Allan B. Culbert	White Farm Eq. Co.
Roger Johnson	Central Soya
Larry Justice	Central Soya

At Mason City (cont.)

Name	Representing
Gerald J. Bailey	Chickasaw Fish & Game Club
Lavern J. Roths	Chickasaw Fish & Game Club
Donald J. Markle	Chickasaw Fish & Game Club
Nelson Braker	Chickasaw Fish & Game Club
Lyle Huffman	Chickasaw Fish & Game Club
Ralph F. McCartney	Self
Jerry Green	NIACOG
Andy Blumberg	Manager, Iowa Falls
J. M. Murphy	Self
Irving Campbell	City of Iowa Falls
Mary Gentry	City Improvement, Charles City
Rhoda McCartner	City Imp. Assoc., Charles City
Fern C. Pudil	City Improvement, Charles City
Vincent C. Gebel	Chickasaw Co. Cons. Board
Charles McLaughlin	Soil Conservation Commissioner
Dennis Carlson	Franklin Co. Cons.
Ed Beardsley	DSC
James R. Allen	SCS
Bud Rattinghaus	SCD
Gene G. Renker	SCS
Larry Caldwell	SCS
Tom Stehn	Cerro Gordo Co. Conservation
Harold L. Boehmer	SCS
Elizabeth R. Miller	State Senator
Leigh R. Cuma	INRC
John Welsh	Waterloo Chamber of Commerce
M. L. Wickersheim	City of Waterloo
Stephan Johnland	Marshalltown C of C
Craig Olson	City of Marshalltown
Westin Jacobson	City of Marshalltown
K. E. Shockley	Swift & Co.
Larry McComer	Marshalltown Trower Co.
W. C. Wheeler	Lennox Industries, Inc.
Dennis Miller	Marshalltown Area C of C
Herb Roush	Lennox Ind. Inc.
B. D. Bottorff	City of Waterloo
David M. Fox	Clapsaddle-Garber Assoc.
Bob Drustrup	Clapsaddle-Garber Assoc.
Cletus Heglik	Self
Gary L. Claude	Wallace, Holland, Kastler, Schmits & Co.
Thomas M. Clay	Farm Bureau
E. L. (Ernie) Zerble	Riverfront Imp. Comm., Mason City
W. M. Banish	City of Charles City
Ward Handorf	Self
Fred Hewton	Bandbox-Cleanall Center
Victor Ziegler	EPA
D. E. Semelhack	Self
Vance Koerner	City of Grundy Center
Fedon Petrides	Consulting Engineer

At Iowa City

Name	Representing
Ralph D. Grotelueschen	Deere & Co.
Howard Bright	SCS
Edward Shima	NFO, Marengo
Darrell R. Kula	Collins Radio
Harry Boren	City of Iowa City
Cynthia Keane	Johnson Co. Health Dept.
Robert Middendorf	Iowa Conservation Commission
Dan Lindquist	DSC
Neil B. Fisher	University of Iowa
C. W. Frank	University of Iowa
Bryce E. Harthoorn	Deere Waterloo Tractor Works
Victor Ziegler	EPA
John R. Boyd	Quaker Oats Co.
Allen R. Baker	Shive-Hattery & Assoc.
Elmer Schneider	Washington Co.
Ralph Schnobelen	City of Riverside
Mrs. Charles Duffy	Self
W. J. Zenishel	Self
R. C. Brandau	Daily Iowan
Stuart Clark	Self
Dr. Edward Buchanan	University of Iowa
Ken Holmes	Powers-Willis
Dennis Geary	State Hygienic Laboratory
Russel Kempf	City of Wellman
I. G. Forber	Quakers Oats Co.
James Elza	East Central Iowa Assn.
Ralph J. Russell	Howard R. Green Co.
Michael L. Kommerer	City of Iowa City
Barry Hokanson	Johnson Co. Reg. Plan. Comm.
Ted P. Lewis	Ia. Electric Light & Power
Bette K. Miller	University of Iowa
William N. Mulde	SCS
G. R. Shaffer	Self
John Dane	Self
Harry Kral	City of Solon
Thomas C. Hare	Square D
Milner Hora	Self
Paul V. Nolan	City of Iowa City
Marvin Thornton	Veenstra & Kimm
J. W. Gerlich	H. R. Green Co.
Gene H. Fritch, P.E.	H. R. Green Co.
Ronnie Stange	City of Solon
Marvin Boone	City of Wellman
Daniel G. Johnson	City of Coralville
Ronald R. Meyer, P.E.	MMS Consultants
Tom Rowold	City of Coralville
Loretta K. Hensen	Newspapers of Iowa Co.
Richard E. Gibson	Johnson Co. Reg. Plan. Comm.

At Iowa City (cont.)

Name	Representing
Ed Brinton	Powers-Willis
Jim Narueson	Johnson Co. Reg. Plan. Comm.
Glenn Kasper	Johnson Co. Farm Bureau
Jerry E. Green	Region VIII
Lu Siegling	Johnson Co. Farm Bureau
Richard R. Dague	University of Iowa
William J. Baum	East Central Intergovernmental Assoc.
Paul R. Jensen	Shive-Hattery & Assoc.
Ken Castek	City of Cedar Rapids
David Brunius	Waconia Sorghum Co.

iowa department of environmental quality

NOTICE OF PUBLIC HEARING

The Iowa Department of Environmental Quality (DEQ) will hold a public hearing concerning the adoption of the proposed Water Quality Management Plan for the Iowa-Cedar River Basin on December 3, 1975, at 7:30 p.m. in Room A 107, Building A, North Iowa Community College, 500 College Drive, Mason City, Iowa; and, on December 4, 1975, at 7:30 p.m. in Lecture Room 1, Physics Building, University of Iowa, Iowa City, Iowa.

The Water Quality Management Plan is specifically directed toward satisfying the requirements of Section 303(3) of the Federal Water Pollution Control Act, as amended, Public Law 92-500, 86 Statute 849 (1972); (33 United States Code Annotated 1313(e)). The purpose of the Water Quality Management Plan is to identify the water quality problems of the Iowa-Cedar River Basin and to set forth a program to correct the problems.

This public hearing is held pursuant to Subsection 455B.32(7) of the Code of Iowa and 40 Code of Federal Regulation Part 131.502 (Federal Register, Volume 39, 19643, June 30, 1974).

Written statements may be submitted to DEQ any time before the hearing, during the hearing and for ten days after the close of the hearing. Oral statements will be taken at the hearing. Time limits on oral presentations may be imposed, if necessary.

Copies of the proposed plan are available for inspection in the city clerk's office in the county seat of each county located in, or partially in the Iowa-Cedar River Basin and at each of the six DEQ regional offices. Written statements and requests for additional information should be addressed to the Water Quality Management Division, Iowa Department of Environmental Quality, 3920 Delaware Avenue, P.O. Box 3326, Des Moines, Iowa, telephone 515/265-8134.

WATER QUALITY MANAGEMENT DIVISION

Joseph E. Obr, P.E., Director

3920 Delaware Ave., P.O. Box 3326, Des Moines, Iowa 50316 • 515/265-8134

The substantive comments (both written and oral) for all six basin plans presented at the hearings and/or directly submitted to the DEQ office in Des Moines, have been compiled. Responses made by the DEQ staff were then presented to the Iowa Water Quality Commission. Those commenting on the plan included federal and state agencies, county and local governments and agencies, industrial organizations, local citizens and special interest groups. Many of these comments have been adopted or substantially justified by change, deletion from, or additions to the basin plans. The Commission approved the plans and copies along with the comments and responses were sent to the Region VII office for EPA's approval. Oral and written statements presented at the hearings are available at the DEQ office for inspection. Copies may be obtained from the DEQ for a reproduction fee.

The DEQ has revised the plans in responses to issues raised, which could be resolved easily and not slow the progress of the study. If, however, it cannot readily be resolved and is a major issue, the issue will be addressed in Phase II of the planning process.

The water quality standards and the stream classifications will be reviewed in 1976. The DEQ, in cooperation with the Iowa Conservation Commission, will evaluate stream use and classification. The chemical and physical parameters listed in the standards will also be subject to review. Public hearings will be held prior to commission approval.

The stream segment and discharger ranking methodology, as required by Sec. 303(e) of the Act, may be the basis for future construction grant funding. Before any future grant priority list is compiled, which may be based on new priority formulas, the methodology will be reviewed and public hearings held. The discharger ranking used in the basin plans basically assumes that dischargers creating the greatest impact on water quality will be addressed more quickly than dischargers with less impact. This methodology will be expanded before it is used for the construction grant ranking.

New data regarding the seven-day ten-year low flow is now available and new population projections are expected. This will necessitate updating many waste load allocations in the Phase II planning program.

As stated earlier, 303(e) basin planning, or Phase I, mainly addressed point source pollution abatement. Under EPA (Phase II) guidelines, states are required to fully address nonpoint source pollution and to develop abatement programs to handle the problem. Phase II planning will continue to include point source waste load allocations and time schedules, and will update the municipal needs tables. Much of this will concern locating errors, or be tied to stream reclassification, new low flow data or standards revision.

The goal of Phase II planning is to reassess controls and needs of combined sewer replacement, feedlot control, urban runoff, and rural nonpoint pollution and to assign implementation programs.

GLOSSARY

Activated sludge is a completely aerobic treatment process by which wastewater is fed continuously into an aerated tank where microorganisms metabolize the organic material. The biological floc is settled in a final clarifier and may be recirculated to the aeration basin. Ninety to ninety-five percent BOD removal can be achieved.

Aerobic denotes biological processes in which oxygen is used for the decomposition of organic material.

Anaerobic denotes biological processes in which organic matter is decomposed in an environment devoid of free oxygen.

Biochemical oxygen demand (BOD) is the quantity of oxygen utilized in the biochemical oxidation of organic matter in a specified time and at a specified temperature.

Combined sewer is designed to carry sanitary sewage, industrial wastes, and storm runoff in a single conduit.

Disinfection of water or wastewater is a method of reducing pathogens or objectionable microorganisms by means of chemicals or other acceptable means.

Dissolved oxygen is the concentration of oxygen dissolved in a liquid. If affects biological changes brought about by aerobic or anaerobic organisms, and is an important environmental factor for growth and reproduction of fish and other aquatic organisms. Determination of dissolved oxygen also serves as the basis of the BOD test.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of gage height or discharge are obtained.

Holding or storage pit is a covered container into which wastewater flows until it can be pumped out and taken to a treatment facility.

Industrial wastewater is the wastewater which originates in industrial processing, cooling, or washing operations.

Infiltration is the groundwater which gains entrance to sewers through joints or improper connections.

Intermediate treatment involves additional settling of the wastewater and may incorporate chemicals to aid the settling process. Normally 50 percent BOD removal may be obtained through this process.

Intermittent stream is a stream with 7-day, 10-year low flow less than 0.1 cubic feet per second.

Lagoon or stabilization pond is generally a shallow geometrical pond which treats pretreated or untreated sewage biologically. Wastewater is retained in the pond for treatment and a clarified effluent is discharged after a specific detention time.

Main sewer is a conduit to which one or more branch sewers are tributary.

Outfall sewer receives the wastewater from a collection system and carries it to a point of final discharge.

pH is the negative logarithm of the hydrogen ion concentration. A pH below 7 indicates an acid condition and a pH above 7 indicates an alkaline condition.

Population equivalent measures the strength of a wastewater in terms of an equivalent number of persons, using an average 0.17 pounds of oxygen demand per person per day in domestic wastewater.

Pretreatment of industrial waste refers to treatment, usually primary, given to the wastewater before it is discharged into a sanitary sewer for secondary treatment.

Primary treatment involves only screening and physical settling of the wastewater. Approximately 30 percent of the BOD can be removed through this process.

Sampling station is a particular site on a stream, lake, canal, or reservoir where systematic samples of water are taken for analysis for physical, chemical, or biological parameters.

Sanitary sewer is a conduit designed to carry sanitary sewage. However, in many cases, it will also carry industrial wastes produced in the area it serves.

Secondary treatment conventionally involves biological treatment of wastewater to reduce the BOD by 85 percent or more. These biological processes usually involve trickling filters, stabilization ponds, or activated sludge processes. Recently, straight physical-chemical processes have been considered secondary treatment on the basis of their BOD removal efficiency.

Septic tank allows solids to settle out of a waste and permits a clarified effluent to be discharged to a ground seepage system. The solids are broken down anaerobically, and the residue must be pumped out periodically.

Sewage disposal applies to the act of disposing of sewage by any method. It may be done with or without any previous treatment of the wastewater.

Sewage treatment refers to any artificial process to which wastewater is subjected in order to remove or alter its objectionable constituents so as to render it less dangerous or offensive.

Sewage treatment plant is a comprehensive term encompassing an arrangement of devices and structures for treatment domestic and industrial wastewater and sludge.

Sewerage is a system of sewers and appurtenances for the collection, transportation, pumping, and treatment of domestic and industrial wastewaters.

Solids are all matter except water contained in a liquid. They may be suspended or dissolved solids.

Storm runoff is the wastewater flowing due to rain water, snowmelt, or other surface runoff.

Trickling filter systems consist of a bed of crushed rock, or other media, coated with biological films, through which primary effluent is passed for secondary treatment. The filter may be followed by a final settling basin, and recirculation through the filter may be employed for better removal. Up to 90 percent BOD removal can be achieved through trickling filter systems in ideal situations.